THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Favorable and unfavorable factors have appeared in iron trade movements of the past week. Considering the amount of rumor and sentiment abroad, tending to depress values, the fact that they have yielded so little in some cases and none at all in others, coupled with the steady booking of business both in pig iron and finished material, gives good support to hopeful views. On the other hand the closing down of certain blast furnaces and steel works, with promise of further restriction in the near future, is unfailing proof of production in excess of consumption, and indicates again a market price that has reached the cost line for some producers of pig iron. A new and unexpected complication on the labor side is the issue raised by the masters' and pilots' union on the Great Lakes, resulting thus far in the tying up of 48 steamers in the United States Steel Corporation's ore fleet. The prospect is that the movement will go on until ore shipments are very seriously cut down, there being a possibility that independent ore carriers will also be sent into ordinary in large numbers. The issue is the right to employ a non-union man, and the affair may develop into large proportions in its effect upon the iron trade of the year. Thus far about 18,000,000 tons of ore has been moved, more than 60 percent of it belonging to the steel corporation, but the latter has a large reserve on hand, the result of its accumulation of a 25 percent safety margin last year. In the East the Pencoyd Iron Works illustrate the bitter sequel of labor troubles. Though the New York structural workers are no longer idle, their long fight has already thrown out several hundred workers in the Pencoyd mills and the number will soon be 1,400. A number of furnaces in Eastern Pennsylvania are going out and the movement has but begun. A meeting at New York this week of representatives of furnaces in New Jersey and the Lehigh and Schuylkill Valleys is reported to have decided upon a restriction of production in the next 90 days. It is expected that this will amount to about 10 percent of the tonnage represented, or about 500 tons a day. No association will be formed, nor will prices be fixed, but there will be harmonious action in the matter of shutting down. Similarly the merchant furnace interests of the Mahoning and Shenango Valleys will meet to devise a plan for a series of 30-day bankings by the various furnaces in turn, as was done last in the spring and summer of 1898. This movement is prompted by the accumulations of Bessemer iron at these furnaces. The market record of the past week has brought out little that does not duplicate recent weeks. Buying is going on steadily. In foundry pig iron prices have been slightly lower in some districts, Northern furnaces pressing the contest for business rather more sharply so that Southern producers find their territory still more restricted for the time being. The $11 Birmingham basis for Southern No. 2 continues in the East, and by selling on analysis a range of $11.25 to $11.75 for No. 2 has been made practically operative by some sellers in the Central West, iron carrying 2 to 2.5 percent silicon bringing $11.25 and iron with 2.5 to 3 percent silicon, $11.75. Pittsburg reports sales of Northern No. 2 foundry at $15.25 to $15.50 and of gray forge at $14.65. Bessemer pig iron has sold at $16 Valley furnace, for the most part, with one sale reported at $15.50. No change in the price of steel billets was made at the New York meeting of steel manufacturers last week, though some sales of import billets to wire mills have been made in the East at $1 a ton below the schedule of domestic manufacturers. The Ashland, Ky., Bessemer plant is now included in the agreement and two Eastern open-hearth plants are likely to be added to the list. The outlook for finished material is good in several lines. Structural business in the East still promises well. Bar iron seems to have come to a stand and concessions come less easily. The plate situation is under close scrutiny. The reports of concessions from pool prices by Eastern mills on agricultural contracts taken in the Central West last week are denied and it is affirmed that no variation from the agreed prices has been made. The slackening of demand in plates is due in part to conditions in the steel car industry. Two plants of the Pressed Steel Car Co. close down Oct. 1 for 30 days. The formation of the United States Steel Products Export Co. is announced. It will conduct the export trade of all the subsidiary companies of the steel corporation.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, Sept. 23.

On account of the curtailed consumption of all grades of pig iron, furnace operators in this and the Valley districts are considering the banking and blowing out of their stacks. It is not probable that the furnaces will go out on a fixed date, but will go out for brief periods when orders now in hand are filled and sufficient stocks are accumulated to take care of the small current demand. A number of the furnaces are already preparing to go out on Oct. 1, and other will soon follow. It is probable that this movement will also include the Cleveland district and it is believed that a month's suspension of all the stacks from time to time will greatly strengthen the present situation by taking a big tonnage out of the market that would otherwise be offered with the result of still further depressing prices. Steel works furnaces, with the exception of those of the Jones & Laughlin Steel Co. and the Edgar Thomson plant of the Carnegie Steel Co., will undoubtedly participate in this arrangement. Still further concessions have been made on Northern brands of pig iron during the week, although the reductions made were not as great as has been the case heretofore. No. 2 foundry has sold here in small lots at $15.25, while gray forge was sold at $14.65. One sale of 500 tons of Bessemer was made at $15.50 at the furnace, although the majority of the Valley operators are holding their iron at $16 and a number of sales have been reported at this price. The buying of all grades of iron continues very light and for immediate shipment only, as consumers are not interested in covering for future requirements under present conditions.

At the meeting of the steel billet association held in New York last Thursday current quotations were reaffirmed. As consumers are not buying in large lots there was considered to be no incentive to make any change in

prices and until a heavy demand comes up it is probable that quotations will remain unchanged. It was announced that the Ashland Steel Co., of Ashland, Ky., has become affiliated with the association and that the Alan Iron & Steel Co. and the Lukens Iron & Steel Co. in the East will also shortly be included. With these concerns in the association all of the Bessemer mills in the North and east of the Mississippi as well as the most important of the open-hearth mills in this territory will be members of the association, thus greatly strengthening that organization. There has been no resumption of operations at the United States Steel Corporation mills in this district, which have been shut down for some time during the week, and the plant at Columbus, O., was added to the list of idle mills. According to present arrangements the Clairton Steel Co.'s plant will resume operations about Oct. 1, and the company's third blast furnace will be blown in about this time.

The McKees Rocks and Allegheny plants of the Pressed Steel Car Co. will be added to the list of idle plants in this district on Oct. 1, for a 30-day suspension of operations. The railroads are not buying cars at this time while large industrial concerns that have been considering the placing of contracts have postponed buying indefinitely.

In finished lines a good current demand is reported for steel bars, while wire and wire nail mills report a big increase in tonnage placed. The sheet trade is also improving, but the volume of business is not sufficient to warrant operations at any of the considerable number of idle plants.

At a meeting of the sales agents' committee of the constituent companies of the United States Steel Corporation held at New York last week it was decided to form the United States Steel Products Export Co., through which all of the exporting of the constituent companies will be done. The National Tube Co. and the American Steel & Wire Co. have figured prominently as exporters of their products during the past two years, but owing to the present lull in the iron and steel trade in this country the other companies will endeavor to develop a foreign demand.

Pig Iron.—The banking and blowing out of stacks in this and the Valley districts for brief periods from time to time during the next two months would have a very beneficial effect on the general situation, and while no definite action has yet been taken, it is probable that furnace operators will come to a conclusion to do this before the end of the week. The accumulation of small stocks and the offering of these lots on the market no doubt had much to do with the present low level of prices prevailing for all grades of pig iron and the temporary withdrawal of these offers and the cultailment of production would result in giving stability to the market which is entirely lacking at the present time. We note the sale of several carload lots of No. 2 foundry at $15.25, Pittsburg, and one lot of 500 tons of forge iron at $14.65. Steel producers that are offering small lots of Bessemer iron in the Pittsburg district are holding their product at $16.85, delivered Pittsburg district, which is equivalent to $16 at the Valley furnaces. We revise quotations as follows:

Bessemer, Valley	$15 50 to 16 00
Bessemer, Pittsburg	16 35 to 16 85
No. 1 Foundry	15 75 to 16 25
No. 2 Foundry	15 25 to 15 75
Gray Forge, Pittsburg	14 65 to 14 75
Chilled Basic, Valley	15 50 to 15 75
Chilled Basic, Pittsburg	16 35 to 16 60

Steel.—The current demand for billets, sheet and tin bars is very small and is limited entirely to small lots for quick shipment. Prices as reaffirmed at the New York meeting are as follows: Bessemer billets 4x4 inches and slabs up to and including .20 carbon, $27, Pittsburg, Wheeling or Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; .21 to .60 carbon, $1 advance, and .61 to 1.00 carbon, $2 advance; open-hearth billets up to and including .60 carbon, $28, and over .60 carbon, $29; billets smaller than 3⅞-inch and sheet and tin bars are $1 per ton extra; Bessemer rods, $35.50 to $36 and open-hearth are held at $1 advance.

Ferro-Manganese.—There is little demand for manganese and we quote domestic 80 percent at $49 per ton delivered in carload lots at buyer's mill.

Skelp.—Low prices are being made on offerings of both grooved and sheared iron skelp. As low as 1.60c has been reported and the range of quotations is from this price to 1.70c. Steel skelp is held at 1.60c to 1.65c.

Muck Bar.—There is practically no buying of muck bar and nominal quotations are $29 to $29.50.

Spelter.—Prime Western grades continue to be held at 5.83½c to 5.85c in carload lots, delivered Pittsburg.

Rails and Track Material.—Little new business is being placed in rails for delivery next year and it is evident that the railroads that contemplated buying some time ago have deferred placing contracts until later in the year. We revise quotations as follows: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $39; less than carload lots, $40; 12 pounds, $32 to $32.50; 16 and 20 pounds, $30.50 to $31; 25 to 40 pounds, $30. Track material: Spikes, 2.05c to 2.10c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Plates.—On Oct. 1, the two plants of the Pressed Steel Car Co. will suspend operations for 30 days. While these plants have been partly closed down during the past month, they have consumed a large tonnage of plates, but their shutting down entirely will still further curtail plate consumption. The normal consumption of plates at these plants when operating in full is about 20,000 tons a month. Agreement quotations on plates are being generally maintained, despite reports to the contrary. We make the following quotations: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds, for less than carload lots. Terms, net cash, in 30 days.

Bars.—The current demand for steel bars is very good, and while orders are small they are very numerous. Bar iron is being offered in this market now at 1.50c, and as low as 1.47 has been quoted. We make the following quotations: Bessemer steel bars, 1.60c; open- hearth, 1.70c; plow beams and cultivator beams, 1.50c, net; channels, angles, zees and tees, Bessemer, under 3 inches; 1.70c; over 3 inches, 1.80c; common bar iron, 1.50c to 1.55c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Structural Material.—The current demand for structural material continues light, although there will be considerable contracting in the near future for buildings to be erected here. Quotations are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—The demand for sheets has improved somewhat during the week, and while concerns are not buying heavily for future requirements, they are closing for fair tonnages for prompt delivery. We make the following quotations: Black sheets in 500-bundle lots and over: No. 28, 2.65c to 2.70c; No. 27, 2.55c to 2.60c; No. 26, 2.45c to 2.50c; Nos. 22 and 24, 2.35c to 2.40c; Nos. 18 and 20, 2.25c to 2.30c; Nos. 14 and 16, 2.15c to 2.20c; Nos. 10 and 12, 2.05c to 2.10c. Galvanized: No. 16, 2.55c to 2.60c; No. 18, 2.80c to 2.85c; No. 26, 3.30c to 3.35c; No. 27, 3.55c to 3.60c; No. 28, 3.80c to 3.85c; No. 29, 4.30c to 4.35c; No. 30, 4.45c to 4.50c.

Pipes and Tubes.—Current demand for merchant pipe continues good and while some concessions are reported from independent mills the National Tube Co. is firmly

maintaining quotations without any difficulty. We quote as follows in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Wrought Iron Pipe. Black. Percent.	Wrought Iron Pipe. Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53
Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¼ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¼ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	62

Wire and Wire Nails.—Wire and wire nail mills report a big demand for their products and jobbers are buying heavily to fill out depleted stocks. Demand for cut nails is also large. We make the following quotations: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—All of the mills report a large volume of orders but in nearly every instance the tonnage is small and is to cover only immediate requirements. We make the following quotations: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots. Tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. Tool steel is quoted 7 cents and upwards, according to the grade.

Old Material.—The market continues very quiet and prices continue to sag. Buying on the part of the mills is all confined to small lots, while dealers are not buying except where bargains are offered. A wide range of prices is reported and in almost every instance quotations are only nominal.

Coke.—Both Connellsville furnace and foundry coke are firmer than they have been for some time, due largely to the shortage in box cars in the Connellsville region. Strictly Connellsville furnace coke is quoted at $2.15 to $2.25, while foundry is held at $2.50 to $2.75. Outside cokes continue to be offered at extremely low prices, furnace ranging from $1.50 to $2 and foundry from $1.75 to $2.25. For the week ending Saturday Sept. 12, the production of the upper region amounted to 251,225 tons as compared with 250,120 tons the week previous, while the output of the lower region amounted to nearly 50,000 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*, 1115 MONADNOCK BLOCK, Sept. 22.

The week under review has been an extremely dull one in most lines of iron and steel. The only activity worth commenting upon is in pipes and tubes, merchant steel and wire products, for each of which there is a continued good demand. Pig iron shows no increase in strength and sales have been made during the week as low as $11.35, Birmingham, for No. 2 foundry. Iron and steel bars are quiet, the former now selling on the basis of 1.50c, Chicago. There is little interest displayed in either sheets or plates, and on the lighter gauges of both these materials some shading of prices has been done. Railroads have purchased several small lots of heavy rails; and there has been a slight increase from building sources in specifications on structural shapes; but the total tonnage of both these materials represented in the week's transactions is not large. Coke is firm and moving freely, a sale of 23,000 tons of furnace fuel having been made in the Ohio district on the basis of $2.15 at the ovens, Connellsville. Scrap shows no change; demand is reduced to a minimum and prices are of a declining nature. Notwithstanding this apathy in the market, sellers are not pessimistic as to the future. The damage to the crops by the recent cold snap was greatly exaggerated, private investigations since confirming the original estimates that the harvest this year will be beyond the average. The recent meetings of the billet and steel bar manufacturers, at neither of which was any change in prices made, have given some strength to the situation, and will undoubtedly result in an increase of confidence on the part of buyers of these materials. While consumption of iron and steel products may be somewhat less than it was a year ago, due to the inevitable leveling process from the abnormal conditions that existed in that period, the statistical condition of the country is good and is not calculated to give rise to the grave doubts current as to the prosperity of the coming year. Manufacturers, generally speaking, are operating to the full capacity of their plants, and while not contracting for large lots of raw material, are placing orders for full quotas from month to month, the total tonnage of which is of no small proportions.

Pig Iron.—Buying continues along the lines which it has followed for several months past, with the only change that the tonnage sold during the week under review is probably smaller. Prices of Southern No. 2 foundry range from $11.35 to $12, Birmingham, the former quotation having been established by the sale of 100 tons to a local consumer in the past week. In the effort to induce buying, representatives of independent furnaces, while not agreeing to take orders at the price, have invited offers from foundrymen in this section on the basis of $11, Birmingham, but without any takers. There are many rumors afloat respecting prices, some to the effect that the Southern association is considering an advance in the near future; others that the differential accorded Eastern foundrymen will be shortly granted to Western melters. One Southern producer of 4 percent silvery iron, has advised its local agent to advance prices 50 cents for November delivery, and 50 cents additional for December shipments, stating that the condition of the market warrants this action. Northern No. 3 foundry has sold during the week on the basis of $15.50, and all grades can now be bought at 50 cents a ton less than a week ago. Our quotations follow:

Lake Superior charcoal	$18 50 to 19 00
Local Coke Foundry No. 1	17 00 to 17 50
Local Coke Foundry No. 2	16 50 to 17 00
Local Coke Foundry No. 3	16 00 to 16 50
Local Scotch Foundry No. 1	17 00 to 17 50
Southern Coke No. 1	16 35 to 16 85
Southern Coke No. 2	15 85 to 16 35
Southern Coke No. 3	15 35 to 15 85
Southern Coke No. 4	14 85 to 15 35
Southern No. 1 soft	16 35 to 16 85
Southern No. 2 soft	15 85 to 16 35
Southern Gray Forge	14 85 to 15 10
Southern Silveries (4% to 5% silicon)	18 35 to 18 85
Southern Silveries (5% to 6% silicon)	18 85 to 19 35
Jackson Co. Silveries (6% to 8% silicon)	20 30 to 21 30
Jackson Co. Silveries (8% to 10% silicon)	21 30 to 22 30
Ohio Strong Softeners	21 00 to 22 00
Alabama and Georgia Car Wheel	25 35 to 26 35
Malleable Bessemer	17 50 to 18 00
Basic iron	16 35 to 17 35

Billets.—The meeting of billet manufacturers held in New York last week resulted in no change in prices. Transactions in this market have been few in number and of small tonnages. We quote Bessemer, $28; open-hearth,

$29; and forging, $32, Chicago delivery, carload lots. Open-hearth forging billets, out of store, 1.60c to 1.70c per 100 pounds.

Bars.—Buying of steel bars continues apathetic, the difference in price in favor of iron throwing a large tonnage to manufacturers of the latter product. Iron is now selling in this market on the basis of 1.50c, Chicago, and is consequently $5 a ton less than the cost of steel. Specifications on iron bars have increased to some extent in the past week, and while mills are not selling very far ahead the whole output is going into immediate consumption. Store trade has declined slightly. We quote mill shipments, Chicago delivery, iron, 1.50c to 1.55c, Chicago; Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c. Quotations from store, iron, 1.75c for car lots, and 1.85c for lesser quantities; steel, 1.90c for car lots, and 2c for lesser quantities, rates; hoops, 2.30c to 2.40c; angles, 2.10c rates.

Sheets.—New business is of small proportions, and on the lighter gauges prices lower than the schedule are being made. Store trade is quiet. We quote black sheets, mill shipments, f. o. b. Chicago, No. 27, 2.71½c to 2.81½c; No. 28, 2.81½c to 2.91½c. Galvanized from mill, carload lots, Chicago delivery, 75 and 10 to 75 and 10 and 2½ percent. Reports are current that the leading producer of this product is shading its regular prices. On lots from store, we quote No. 27 black, 2.90c to 3c; No. 28, 3.05c to 3.15c; galvanized, 75 to 75 and 5 percent.

Plates.—There is very little change to report, the market continuing weak and demand being of small proportions. Central Western mills are reported to be offering light gauges in this section at less than schedule prices, though these rumors cannot be traced to any definite source. Other producers are holding quotations firm. We quote mill shipments, Chicago delivery: Tank steel, ¼-inch and heavier, 1.75c; flange steel, 1.85c. Prices for lots from stock, tank steel, ¼-inch and heavier, 2c to 2.10c; 3-16, 2.10c to 2.15c; No. 8, 2.15c to 2.20c; No. 10, 2.30c to 2.35c; flange steel, 2.40c to 2.50c.

Structural Material.—A slight increase is noted in the specifications sent in during the week, though the volume of new business is small. We quote mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. Lots from store, 2.10c to 2.25c per 100 pounds, rates.

Merchant Steel.—Implement makers and carriage builders have been contracting freely, and there has also come a good demand from the jobbing trade. Specifications are keeping up to past proportions and mills are full of work. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c; flat sizes; concave and convex, 2.25c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.35c to 2.45c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; special, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—No diminution is noted in the demand for pipe, mills reporting that orders and specifications are in ample volume and for fair tonnages. We quote carload lots, mill shipment, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ⅜ in. inclusive	66.35	56.35	68.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—The demand continues of a satisfactory nature, and mills are getting behind in shipments. Boiler makers and jobbers in all parts of the country are specifying freely on their contracts. Prices are without change, mill deliveries, carload lots, being as follows:

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	43.35	38.35
1¾ to 2½ in.	55.85	35.85
2¾ to 5 in.	60.85	45.85
6 to 13 in.	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	40	35
1¾ to 2½ in.	50	32½
2¾ to 5 in.	57½	42½
6 to 13 in.	50	32½

Cast Iron Pipe.—New business continues fair, orders being usually for small lots. The leading producer is still handicapped in its deliveries by a scarcity of cars at all its plants. We quote carload lots, f. o. b. Chicago: 4-inch pipe, $30; 6-inch and upwards, $29; gas pipe, $1 a ton higher.

Rails and Track Supplies.—The demand for track supplies and light rails continues undiminished. Several railroads have placed contracts during the week for small lots of heavy rails, though the total tonnage of this business is not large. The lack of specifications for standard sections has put some mills in position to give fairly prompt deliveries on this material. Prices are without change. We quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality, rails, $27; 25-pound rails, $32 to $34; 12-pound rails, $39 to $40, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.20c (out of store, carload lots, 2.25c to 2.35c rates); second quality, 2.10c; track bolts, 3½x¾ with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3c to 3.10c, with usual differentials for other sizes.

Wire and Wire Nails.—Emphatic denial is made by the leading producer of the reports that it is shading prices on wire and nails. The situation, it answers, is not one to warrant any reduction from present quotations. Demand for all its products is heavy and on bale ties and smooth wire it is two to four weeks behind in shipments. The manufacturing trade has contracted heavily during the past two weeks for smooth wire spring and mattress wire; copper wire and wire rope, etc., while the jobbing hardware trade has sent in heavy specifications for farming material. Quotations to jobbers, Chicago delivery, follow: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in small lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90; staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; small lots, $2.70. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—Dealers report a good demand, though only a small proportion of it has come from the foundry trade. Gas companies, power stations and blast furnaces are buying freely, one contract with a furnace company in Ohio closed during the week calling for 23,000 tons of Connellsville coke, the price being $2.15 at the ovens. The scarcity of cars in the Connellsville region is handicapping shippers to no small degree, and spot coke in this market is scarce. We quote Connellsville, 72-hour foundry coke, Chicago delivery, $5.40 to $5.65; Virginia and West Virginia grades, $5.15 to $5.40.

Old Material.—There is little change to report. There is no demand to speak of from mills, and few dealers are in the market for any material. Prices are receding. We quote dealers' selling prices, gross tons, as follows:

Old iron rails	$17 00 to 17 50
Old steel rails (mixed lengths)	13 50 to 14 00
Old steel rails (long lengths)	16 00 to 16 50
Relaying rails	26 50 to 27 00
Old wheels	17 00 to 17 50
Heavy melting steel	13 00 to 13 50
Mixed country steel	11 00 to 11 50

The following are selling prices per net ton:

No. 1 R. R. wrought	14 25 to 14 50
Mill scrap	12 50 to 13 00
No. 1 machine cast scrap	13 00 to 13 50
Iron axles	21 00 to 22 00
Axle turnings	12 25 to 12 50
Wrought turnings (free from cast)	11 00 to 11 25
Uncut wrought iron boilers	8 00 to 8 25
Grate bars	10 50 to 11 00
Pipes and flues (clean)	12 00 to 12 25
Tank iron	12 00 to 12 25
Hoop and band iron	8 00 to 8 25
Sheet iron	8 00 to 8 25
Wrought drillings	10 75 to 11 00
Stove plate	10 00 to 11 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 22.

Owing to the difficulty between the Pittsburg Steamship Co. and its masters and mates, referred to in another column, the lake situation has been in a chaotic condition. The prospect of a suspension of navigation has not, however, caused any inquiry for ore and furnaces show no indications of being afraid that they will not have enough ore to meet their requirements. Freights are stationary.

Pig Iron.—Foundrymen are complaining of slack business. Some of them are not melting more than one-fourth as much iron as they did a few months ago. Buyers of castings are demanding reductions of prices in harmony with the decline of pig iron, and foundrymen who are still taking iron on old high contracts find it impossible to make quotations to satisfy these demands. The usual quotation for pig iron in the Valley is very near to $15, but a lower figure would doubtless be given on a large order. Southern Ohio is selling at from $14.75 to $15 at the furnace. Southern iron is usually quoted at $11.50, Birmingham, but there are rumors of lower prices. The volume of business is small, but those who buy insist upon immediate delivery, showing that they are meeting only urgent requirements. Furnacemen declare that the early future will see many plants blown out, if present prices decline to the extent of a dollar. We quote as follows for Cleveland delivery, save on gray forge, which is at Valley furnace:

Bessemer	$16 85 to 17 35
No. 1 Strong Foundry	16 50 to 16 75
No. 2 Strong Foundry	15 75 to 16 25
No. 3 Foundry	15 25 to 15 50
Scotch No. 1	16 50 to 16 75
Scotch No. 2	15 75 to 16 25
Gray Forge, Valley furnace	14 00 to 14 25
Lake Superior charcoal	18 50 to 19 00

Coke.—In spite of the dullness in the iron market, the railroads are extremely busy and complaints of failure to deliver coke are as numerous as they were at this time last year. For strictly Connellsville 72-hour foundry coke, the price is $3 to $3.50.

Finished Material.—Business is not as good as last week. Bar iron, which showed some signs of steadying at 1.50c at the mill, is weaker and sales as low as 1.45c at the mill have been made, while there are reports of even lower quotations. Steel is quiet with prices unchanged at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. The rumor of a reduction in prices of plates has not been verified. Competition in sheets continues. On sales made through jobbers, the prices for the principal products are unchanged as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12 to 14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

Old Material.—Very little business is being done and prices are still tending downward. Some consumers, however, report increased business and expect to come into the market soon. We quote as follows, gross tons, f. o. b. Cleveland:

Old iron rails	$19 00 to 20 00
Old steel rails (over 6 feet)	17 00 to 18 00
Old steel rails (6 feet and under)	16 00 to 17 00
Old car wheels	17 00 to 18 00
Steel axles	22 00 to 23 00
Cast borings	7 00 to 8 00
Steel boiler plates	13 25 to 13 50
Malleable iron (railroad)	15 00 to 15 25
Malleable iron (agricultural)	13 00 to 14 00
Heavy steel	13 00 to 13 50

We quote the following net tons:

No. 1 R. R. wrought	16 50 to 17 50
Mill scrap	14 00 to 14 50
No. 1 machine cast scrap	14 50 to 15 00
Iron axles	22 00 to 23 00
Axle turnings	13 00 to 14 00
Wrought turnings (free from cast)	13 00 to 13 00
Uncut wrought iron boilers	9 00 to 10 00
Grate bars	10 00 to 11 00
Pipes and flues (clean)	13 00 to 14 00
Tank iron	13 00 to 14 00
Hoop and band iron	10 00 to 12 00
Sheet iron	8 00 to 9 00
Wrought drillings	13 00 to 13 00
Stove plate	11 00 to 11 50

CINCINNATI.

Sept. 22.

The coke market is not so active this week as last. There is also a noticeably easier tone prevailing and the best brands are now quoted at $2.75 to $3 f. o. b. ovens. There is not much offering at the inside price, but that figure is obtainable on any large contracts.

Pig Iron.—There has been but little change in the actual condition of the pig iron market the past week. A fairly good run of orders is coming in and there is a steady inquiry for prices. Sales of foundry grades are on the basis of $11.50, Birmingham, for Southern iron and $14.75, Ironton, for Northern. The orders are still confined to small lots ranging from 25 tons to 500 tons. There is a steady call for prompt shipment on nearly all orders placed, indicating that buyers are holding off until the last moment. The announcement that Southern furnaces are selling iron in the East at $1 per ton less than the official price to Western customers has not made any particular stir in the market, as buyers are not placing any important contracts, and the bulk of the orders being for single car lots there is not so much contention over the price. The effect of the differential price will be to make the buyer in the Western territory hold off in his purchases under the belief that a further concession will come to him, and the Eastern and Western price will assume a level as in the past. The market has not a lively appearance and melters of foundry iron are complaining somewhat of dull business, although the stove manufacturers are reported fairly well supplied with orders. Northern irons are easy and Southern iron has been undersold as far South as Columbus, O., the past week. This competition of Northern iron with Southern is another element of weakness in the Southern iron situation. The territory in which Southern iron can compete is becoming more restricted, but Southern furnaces rely on this feature to give them the lower freight rates they have asked for, as it will soon become evident to the Southern railroads that a lower freight rate is necessary to allow Southern iron to move as freely as heretofore. The following are the prices current, f. o. b. Cincinnati:

Southern Foundry No. 1	$15 25 to 15 75
Southern Foundry No. 2	14 75 to 15 25
Southern Foundry No. 3	14 50 to 14 75
Southern Foundry No. 4	14 00 to 14 50
Southern Foundry No. 1 soft	15 25 to 15 75
Southern Foundry No. 2 soft	14 75 to 15 25
Gray forge	13 25 to 13 50
Northern Foundry No. 1	16 40 to 16 65
Northern Foundry No. 2	15 90 to 16 15
Northern Silvery (8% silicon)	18 65 to 19 15
Southern car wheel iron	26 25 to 27 25

Finished Material.—There has been a little more activity in the finished lines the past week, but the buying is still on the hand to mouth order. An easy tone prevails and quotations are slightly lower than last week on some descriptions. Prices for bar irons are still irregular and on car lot orders 1.55c to 1.60c f. o. b. Cincinnati are the ruling quotations. Steel bars remain at 1.73c base, half extras, with the retail price 1.90c to 2c, for iron and steel out of store. Galvanized sheets are being quoted at 75 and 7½ percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are sell-

ing as follows: No. 28, 3.05c; No. 27, 2.95c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.40c; No. 10, 2.30c. Tank plates are firm and sell out of store at 2.05c for ¼-inch and 2.15c for 3-16-inch. Beams and channels are quoted at 2c from stock, and angles at 2c for base sizes. In merchant pipe there is no change in the market. Dealers are handling a fair run of orders and in spite of some underselling on the part of the independent mills the schedule is fairly well maintained and the leading interest is getting a large share of the business.

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	35.2
1¾ to 2¼ inch	54.2	34.2
2¾ to 5 inch	59.7	44.2
6 to 13 inch	54.2	34.2

Old Material.—Quotations are still largely nominal and the market is dull. We quote:

Old No. 1 railroad wrought, net tons	$14 00 to 15 00
Cast machine and foundry, net tons	12 00 to 12 50
Old iron rails, gross tons	19 00 to 20 00
Old steel rails, gross tons	17 00 to 18 00
Old short lengths, gross tons	14 50 to 15 50
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	11 00 to 11 50
Cast borings, net tons	6 00 to 6 50

PHILADELPHIA.

Sept. 22.

The present tendency of the market is not toward improvement. Prices, when not controlled by pools, gradually but surely decline, and even agreements are being strained. Renewed efforts to capture more foreign business are being made. Consumption of pig iron by the smaller industries is large, but not large enough to consume the immense output. Very large quantities of structural material have been tied up on account of strikes. The Pencoyd Iron Works, which supplies a large amount of material to the American Bridge Co., is being shut down on account of lack of orders and probably 1,400 men will soon be idle. Five hundred men were laid off last week and 450 this week.

Pig Iron.—There is a little more demand; the prices are a trifle easier. Large consumers are still unwilling to contract for forward deliveries and there is much uncertainty as to what their requirements will be. For 500 tons or more, $16 delivered can be shaded for No. 2 X foundry or $15 for standard brands of gray forge. Small lots are disposed of at $17 for No. 2 X. We quote: No. 1 X foundry, $17.50 to $18; No. 2 X foundry, $16 to $17; No. 2 plain foundry, $15.25 to $15.50; standard gray forge, $15 to $15.25; ordinary, $14.50 to $14.75; basic, $15 to $15.50.

Steel.—There is hardly any business. While prices are nominally unchanged, actual sales show lower prices. Former purchasers of billets are now sellers, as they are making more than enough for their own use. Prices for small lots are from $28 to $28.50, but 1,000-ton lots could be had for about $27. Foreign steel sells at $26 to $26.50.

Finished Material.—The demand is a little stronger, but not enough to keep the mills busy. Owing largely to pooling arrangements, prices are unchanged. Some mills are closed, while others are working irregularly. Prices for carload lots are as follows: Best refined bar iron, 1.60c to 1.65c; ordinary bars, 1.50c to 1.55c; steel bars, 1.73½c to 1.75c; plates, beams, channels, angles, 1.73½c to 1.75c.

Old Material.—There is a little more business, but no improvement in prices. We quote as follows, delivered: Old steel rails, $16.25 to $16.50; miscellaneous heavy steel, $16 to $16.50; low phosphorus scrap, $23 to $25; old steel axles, $18 to $19; old iron axles, nominal, $20 to $21; old iron rails, nominal, $19 to $19.50; old car wheels, nominal, $18 to $19; choice RR. No. 1 wrought, $16.50 to $17.50; country scrap, $14 to $15; machinery cast, $14 to $15; No. 2 light scrap (forge), $15 to $16; No. 2 light scrap (ordinary), $11 to $12; wrought turnings, $10.75 to $11.25; wrought turnings, choice heavy, $12 to $12.50; cast borings, $7 to $7.75; stove plate, $11.50 to $12.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Sept. 22.

Pig Iron.—Although orders for small lots were the rule, the aggregate sales during the past week were larger than they have been for a similar period in some time. Sales agents say that it shows consumer's stocks are either entirely exhausted, or very nearly so. They are strengthened in this belief by the pressure buyers bring to bear concerning immediate shipment, which forms a feature of nearly every order taken. The orders received range from 25 to 800 tons, but rarely go higher. One leading consumer here is gradually providing for his requirements for the balance of the year, and now and then can be found a buyer who has enough confidence in the situation to give orders at present prices running into the new year, but the generality of buyers seem committed to the hand to mouth policy. Southern No. 2 foundry is selling at $11 Birmingham, but there is good authority for the statement that $10.75 is being done. Northern brands are responsible for most of the unsettled aspect the market has developed. It seems to be an absolute impossibility to get an accurate quotation. Northern No. 2 foundry, according to some reports, is selling in this market at $16, yet the majority of sales agents declare that $16.50 is the minimum figure, while some maintain that $17 would be nearer the proper price. Some furnaces are said to be discouraging sales while the market remains in its present state. New York prices are as follows: Northern No. 1 X foundry, $17 to $17.25; No. 2 X, $16.50 to $17; No. 2 plain, $16 to $16.50; Southern No. 1 foundry, $15.75 to $16; No. 2 foundry, $15.25 to $15.50; No. 3 foundry, $14.75 to $15; No. 4 foundry, $14.25 to $14.50.

Rails.—General conditions are considered satisfactory. The claim that railroads are not providing for their requirements next year as well as was expected, is met with the statement that the tonnage now booked for that period is fully as large as at this time a year ago, with extensive additional buying not likely to set in for another month or so. Standard sections remain $28 at mill.

Billets.—The best information obtainable here is that the pool made no change in prices at its recent meeting. That its schedule is being cut in the market is a matter of general comment. We hear of a member of the pool making a sale of 3,000 tons to a New England wire mill at close to $26 delivered, as against a $27 schedule, the reduced price being made to meet foreign competition. German billets can easily be had at $27 ex ship, duty paid, while even better is intimated.

Finished Iron and Steel.—The American Bridge Co. has sold 23,000 tons to the New York Central Railroad. Officials of the company do not concur in the reports being circulated concerning the poor outlook, and after a most thorough inquiry, in which architects were freely consulted, find that there are 200,000 more tons in sight now than at this time a year ago, with only projects sure to be carried to completion being taken into calculation. If those about which there is a little doubt were considered, the tonnage would be almost double. Interest just now is chiefly centered in the Blackwell's Island contract, which amounts to 43,000 tons, according to official figures, our statement last week being in error. The appropriation by the city authorities would make the price about 5 cents, including the nickel steel and erection. It is said here that no reliable concern could take the contract, without incurring great loss. The bids go in in a few days, and some foreign interests are expected to compete. Sheets are only in fair demand, and the buying is for the most part to meet immediate requirements. Bars continue to be a weak feature, and all sorts of quotations are going the rounds, with business slow. In plates only limited quantities are being sold, with a tendency manifesting itself to insure buyers against decline. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.79c to 1.80c; flange, 1.90c to 2.10c; firebox, 2.10c to 2.20c; refined iron bars, 1.61c to 1.80c; soft steel bars, 1.70c to 1.75c; steel sheets, in carloads, New York, No. 28, black, 2.90c to 3.05c; galvanized, 75 and 2½ off.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Sept. 22.

Pig Tin.—The market during the past week declined considerably, with the demand being as slow as it has been for weeks. Spot continues to command a good premium over October, on account of the very small arrivals for the month, which aggregate 1,597 tons, with 2,440 tons afloat. No scarcity is expected, as arrivals ordered, and those available, would prevent it. The tone of the market is easier. In London during the week the lowest prices of the year were recorded, with the general situation abounding in many adverse features. Closing prices today at the Metal Exchange follow: Spot and September, 26¾c to 27c; October, 26.15c to 26.35c. London closed today as follows: Spot, £118 7s 6d; futures, £119.

Copper.—Trading has the same dull appearance it has had for weeks. Quotations are entirely nominal, and the only important development of the week was the ⅛c reduction in the "official" price of casting. Prices quoted below are being shaded in the open market from ¼ to ⅜ cents, the latter being for casting. In London the market declined on heavy offerings from America. Closing prices at the Metal Exchange today follow: Lake, 13¾c to 13⅞c; electrolytic, 13⅝c to 13¾c; casting, 13¼c to 13⅜c. London's closings today follow: Spot, £56; futures, £55 17s 16d.

Lead.—Spot continues scarce and easily sells at 4.50c. The trust during the week increased its price to 4.40c, with delivery in three weeks or so. In St. Louis the market is firm at 4.40c. London is £11 2s 6d.

Spelter.—Remains strong at 6.00c. St. Louis slightly weaker at 5.70c. London declined to £21.

Antimony.—Cookson's is 7¼c, Hallett's 6¼c, and outside brands 5¾c to 6c.

Quicksilver.—Is quoted at $47.00 per flask of 76½ pounds in lots of 100 flasks. London unchanged at £8 2s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK. Sept. 22.

Western melters continue to buy copper in small lots, due to the high prices asked. Demand is only of moderate proportions. Pig lead and spelter are firm, with an increasing shortage. We quote Lake copper, carloads, 13⅜c to 13⅝c; casting, 13¼c to 13⅜c. Pig tin, carloads, 27½c, lesser lots, 27¾c. Pig lead, 4.50c in 50 to 100-ton lots, and 4⅜c to 5c in small quantities; spelter, 5.70c in carload lots, and 6c to 6¼c in small quantities; sheet zinc, 6¼c; antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's.

Proposed Banking of Valley Furnaces.

(Special Telegram.)

PITTSBURG, Sept. 23.—A meeting of the merchant Bessemer furnace operators in the Mahoning and Shenango Valleys will be held this week for the purpose of putting a 30-day shutdown plan into operation. This plan was adopted once before—in the spring of 1898—dates being fixed when the furnaces each in turn would be banked or blown out for a period of 30 days.

Receiver for Eddystone Foundry & Machine Co.

(Special Telegram.)

PHILADELPHIA, Sept. 23.—David Townsend was appointed receiver today by the United States Court, of the Eddystone Foundry & Machine Co., formerly known as the Gruson Iron Works, of Eddystone, Pa. The company manufactured special steel castings and did a jobbing foundry business.

The McConnell Asbestos & Covering Co., of Pittsburg, Pa., has announced to the trade that it succeeds the McConnell Asbestos Co., Ltd., and John A. McConnell & Co., with offices in the Farmers' Bank Building.

LARGE GAS ENGINES.

Very large gas engines will be among the most directly interesting features of the power plant exhibit at the St. Louis World's Fair next year. The gas engine group will contain, to begin with, the largest gas engine in the world available for service by the spring of 1904. The engine in question will develop 3000 h. p., and will come from the works of the John Cockerill Co., of Seraing, Belgium. It will have a length over all of 67 feet and an extreme breadth to outside of dynamo of 21 feet. The engine will be of the horizontal two-cylinder type, each cylinder being 51 inches in diameter, with a stroke of 55 inches. The fly-wheel will have a diameter of 26 feet, and when the engine is developing 3,000 h. p. the revolutions will number 85 per minute. The extreme length of bed-plate proper will be 77 feet. About thirty tons of coal a day will be consumed in the generation of the gas for operating the engine. At the Paris exposition the Cockerill company exhibited a 600-h. p. gas engine, and this item excited more interest and comment probably than any other individual topic in that exposition. The firm of A. Borsig, of Tegel, near Berlin, will contribute a 1750-h. p. Oschelhauser gas engine, and Julius Pintsch, of Berlin, will supply the gas producer for this engine. The total shipment of the Borsig engine and the Pintsch producer will be about 660 tons. The gas producer will be of sufficient capacity to furnish 2400 h. p., and when developing 1750 h. p. the exposition is called upon to give the Pintsch representatives 1575 pounds of anthracite coal per hour, and when not in operation, 50 pounds of coal per hour. The producer will supply the engine direct, without any intermediate storage tank. The Gasmotorenfabrik-Deutz, of Deutz, near Köln, Germany, will contribute to the power plant a 900-h. p. gas engine, and the Allis-Chalmers Co., of Chicago, proposes to install an 1800-h. p. horizontal, two cylinder gas engine of the Augsburg-Nürnberg type. This engine is the design of the Vereinigte Maschinenfabrik Augsburg and Maschinenbaugesellschaft Nürnberg, A. G. of Nürnberg, Germany, the right to build these engines in the United States having been recently acquired by the American firm. The Allis-Chalmers engine will measure 60 feet over all, with an extreme width to outside of dynamo of 19 feet. The fly-wheel will be 16 feet in diameter, and when developing 1800 h. p. this engine will turn up to 92 revolutions per minute.—[Cassier's Magazine.

The Swedish Iron Mines.

A foreign exchange has the following: The first practical step in the direction of a further development of the principal iron ore mines in Sweden is to be found in the announcement that the Grangesberg-Oxelosund Traffic Co. has concluded a loan of 25,000,000 kronen, in the form of 4½ percent bonds redeemable at 103 percent, with a syndicate headed by the Deutsche bank. At the same time the Traffic Co. proposes to increase its capital by the issue of new shares, existing holders of two shares being entitled to one new share at the price of 1,150 kronen. The money realized from these transactions will be advanced mainly by way of loans to the Luossavaara-Kiirunavaara and the Gellivare Malmfalt Iron Ore Mining Co., the majority of whose shares are already in the possession of the Traffic Co. It may be remembered that the Swedish parliament a few months ago rejected the Government proposal to lend 20,000,000 kronen to the Traffic Co. or the iron ore companies for the purpose of extending the working operations of the latter, and the before-mentioned loan concluded with the Deutsche Bank and Scandinavian institutions was the only alternative the Traffic Co. could adopt. The latter have the option until 1905 of increasing their holdings in the mining companies to the extent of controlling nine-tenths of the capital, and by means of the proposed advances they will practically become the owners of these extensive mines."

E. L. Vogel, for some years connected with the Chas. Munson Belting Co., of St. Louis, and who resigned on the transfer of the business to other hands, has become connected with the Graton & Knight Mfg. Co., 54-56 South Canal St., Chicago, as special agent for the sale of its leather belting.

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OLD LOW POINTS NOT TO BE EXPECTED.

According to the vagaries of human nature, rather than according to the abilities or position of the speaker, the most opposite views are expressed as to the early future of the iron industry. The confusion arises from men according to their personality, taking different facts for the basis of their conclusions. One man assumes that the world has been wound up never to run down and a condition found at one end of the pendulum's swing will be repeated at continued and regular periods. Another sees no likelihood of change from given conditions, once they have been established for a few months or possibly years.

For nearly six months the trade has seen Bessemer pig iron dropping at an average rate of almost exactly a dollar a month. For months previous it had been about $21 at Valley furnace. Back in 1897 the extreme low point had been recorded, when in the summer it touched $8.75; the average for the year 1898 was about $9.75, while in 1899 a high point of $25 was touched.

As soon as this decline began, six months ago, the trade divided. One element at once saw a recession to a low point of $9 or $10, while another element saw the prospect in the near future of many furnaces going out of business because they could make pig iron for only a little bit less than it had previously sold at. A minority made feeble attempts to sort out the influences likely to recur from those not likely to occur, but all such attempts were made in a half-hearted and uncertain spirit. As month by month the one extreme party saw the decline continue beyond expectation, while the other observed a resisting force to a rapid drop which had not been suspected, both lost confidence in their predictions with equal rapidity.

In the problem of a manufacturer with a market which is not pressing for his product the items of interest on investment, taxes, profit, and minor fixed expenses do not enter. It is a question purely of cost of assembled materials and cost of fabrication. To the Valley blast furnace, therefore, it is almost wholly a matter of labor cost, and the cost, delivered, of ore and coke. As to labor, it ought to be admitted frankly that there can be no early return to any such basis as prevailed in 1897. The low labor cost all over the country in that year was not suddenly reached; production cost kept falling for four years with an expanding market and increasing tonnage. The crucial point then is the cost of coke and ore.

Standard Connellsville blast furnace coke sold as low as 85 cents a ton in 1894 and the recognized statistician of the region did not put the average price for the year at over one dollar a ton. Those who take a stray shot at predictions point out these low prices and intimate that their repetition will form one factor in duplicating the low record on Bessemer pig iron. Unfortunately there is an anachronism of three years, since 85-cent coke came in 1894 and $8.75 pig iron in 1897. When coke was at its cheapest, Bessemer pig was over $10 at furnace, and when Bessemer pig was at its lowest, coke was from $1.55 to $1.75. If the best facts that are available be culled from history, therefore, one could argue that the previous low point on pig iron should be broken.

It is much more reasonable to base judgment, however, upon the point that the extremely low wages in the coke industry in 1894 are not likely to be duplicated, and that all of the net advance of 75 percent in wages which has since occurred cannot be wiped out. It is still easier to grant that the accretion of value of coking coal in the ground can never be wiped out, but will rather be added to. The best coking coal land in the region was worth ten years ago but a very few hundred dollars an acre. Its present value cannot be stated, because none has formed the subject of a market transaction. Judged by less valuable coking coal land, however, it can safely be put at about $2,000 an acre. A 10-foot vein means 15,000 tons of coal per acre, or about 9,000 tons of coke, so that the manufacturer must set aside 22 cents a ton as depreciation, and the amount should be considerably larger to cover interest. There is no possibility of dollar coke under such conditions, and in fact about $1.75 represents the minimum to which a coke operator would be inclined to follow the market. The increased value of coking coal lands represents a permanent value, which will not rise and fall as general conditions are prosperous or otherwise. Nature is not duplicating the coal veins. The universe is not wound up never to run down.

With iron ore land the same principle holds good, that a permanent value has been put upon such ores which exist only in certain quantities and which permit the manufacture of pig iron more cheaply than is possible with other more extensive and less pure ores. That this value has been permanently placed upon the Lake Superior ores is indicated clearly enough in that the reserves in the South, being less pure but many times as extensive as those in the lake region, have experienced but the slightest accretion in value, measured in cents per ton in the ground.

It is well, therefore, in attempting to forecast what the future may have in store, to draw a clear line between conditions of the past which can be duplicated, and those which are practically impossible of duplication.

SHOP RULES AND REGULATIONS.

A nicely framed copy of a series of "rules and regulations" is a familiar object in many shops. Sometimes the copy it not framed nor it is invariably in a conspicuous position, but somewhere and somehow the views of those in authority are presented in printed form and fastened to the wall in much the same spirit in which the flag is nailed to the mast. Usually the items on the list rehearse the time of stopping and starting work in the morning and the afternoon, and before and after the interval for lunch; the date on which the cashier pays wages, and many other matters of more or less importance. The latest recruit to the shop or office force requires a certain amount of information in order that he can the sooner get into line and keep in step with his associates. The matter of rules is therefore an advantage to both the employer and the employe and renders the relationship between the two less susceptible to friction from misunderstandings.

The employes of machine shops, foundries and steel plants are of an age when the really essential elements in a set of regulations can be made in brief form. The more extensive the field covered by the regulations, the less the prospect of their being read. On the other hand the briefer the announcement the more certainly it will take root in the memory.

Unfortunately the tendency of the man drafting a set of regulations or, as is probably the case, adapting one from his neighbor's code of shop laws, is to imitate contract construction. Better that everything be included than that even one desirable detail be omitted; and so the document in omnibus style grows apace.

The injunction to do or not to do the several things which the management may hold desirable or objectionable is taken as imperative and mutually agreeable when the employe commences work, but the real effectiveness of the rules is of course in the enforcement of them. It is of little use to threaten the discharge of a workman unless actual dismissal follows the violation of the rule. In fact as was recently shown in an English law suit, mentioned in *The Iron Trade Review,* the making of shop regulations is no protection to the employer even when an employe is injured in consequence of an infraction of them. The employer must have followed the practice of enforcing penalties if he is to get the benefit of published regulations.

A case in point was that of a youth fatally injured by an attempt to put a belt on a pulley. The shop rules and regulations specifically forbade the placing of belts on line shafts while the machinery was in motion. The rule was clear in terms and threatened the prompt discharge of anyone guilty of the practice. The relatives sued the firm for damages and in reply the rules were presented to show the position of the employer in regard to the cause of injury. Testimony was then introduced to prove that while the rule was emphatic its enforcement was a dead letter and the employer lost his case.

How to secure the best heed to his rules is the employer's problem. We have already mentioned brevity as a requisite. A card from the foreman is a neat and easily handled form and could contain information of a far more useful character than the shop code of laws usually submits. There are shops and shops, with widely varying systems of handling time cards, tools and supplies, etc. Give him a fair amount of time and the new workman will fit the place, providing he has the aptitude to meet average requirements. During this period he will acquire by the slow awkwardness of inquiry and blundering an acquaintance with the ways of the place.

The drafting room would seem to offer a field for a definite system. There is no reason why draftsmen should not be in possession of a pamphlet presenting the style adopted by the office for drawings, tracings, etc. Such a dictionary for example as was described in *The Iron Trade Review* of last week, avoids controversy, preserves in strict uniformity the practice established by the most competent authorities and thus maintains a high standard of efficiency. A pamphlet of this kind may be extended to the work of the machinist as has been done in the handbook for apprentices prepared by a leading machine tool builder, and a few shop rules incorporated where this addition is absolutely essential.

There are many things that seem of doubtful expediency for presentation in the shop code. Not in all cases because they are of questionable benefit, but the good sense of the workman can be trusted, without undue suggestion, to follow the course that a good footing with his employer should prompt. It is evident that the assignment of wages, the misuse of tools, buildings or supplies, the unauthorized assumption of dangerous work, the temporary leaving of the plant or even of work except upon matters of an urgent nature, do not need an edict from the manager to establish them as objectionable. A threat is not an agreeable argument and lacks all merit unless the penalty is impartially and promptly enforced. Negligence is an eyesore to the conscientious workman as well as to the foreman and employer, and general rules are impertinent in many cases of this kind. A direct reprimand of the injudicious is more forceful than any series of written rules. At the same time the workman who cannot readily recognize the necessity of certain restrictions calculated to insure safety and efficiency should be eliminated from a class that as a rule has a long memory for poor work.

Pools Among Foreign Plate Manufacturers.

It is understood that the German steel plate makers have entered, or are about to enter, into a syndicate arrangement with respect to output and prices. In this connection British advices are that there is a possibility of the Scotch and English steel plate makers reviving their understanding.

The quarterly report of the Sloss-Sheffield Co., at the meeting at which the regular quarterly dividend of 1¾ percent was declared on preferred stock, shows that the net earnings increased from $311,969 in 1902, to $327,326 in 1903. The surplus June 1 was $2,071,717.

At the annual meeting of the American Steel Foundries, held last week, of the seven directors whose terms expired, all were re-elected except Donald H. Mann, in whose place Geo. L. Peabody was elected. The directors elected were: C. M. Schwab, E. H. Gary, Alfred Clifford, Charles Miller, J. M. Schoonmaker, S. R. Callaway, George L. Peabody. More than 90 percent of the shares of the company's stock was represented and all action taken was unanimous.

The Jones & Laughlin Steel Co., Pittsburg, has purchased an additional seven acres of land adjoining the site of its Eliza blast furnace plant at a cost of about $150,000.

The Labor Situation.

A TIE-UP OF THE STEEL CORPORATION'S ORE FLEET.

A controversy, due ostensibly to a very small grievance and illustrating in a very striking manner the extremes to which labor unions will often go, has already resulted in 48 steamships of the Pittsburg Steamship Co., carrying ore on the Great Lakes, being retired from service and may cause a general suspension of navigation. The Masters' and Pilots' Association really had no grievance against the steel corporation, but started the trouble because Capt. Frank C. Rae, of the steamer Clemson, of the Provident Steamship Co., would not join the union and engaged his father, who is not a union man, as a mate on the Clemson. The fact that A. B. Wolvin, general manager of the steel corporation's fleet, is manager also of the Provident Steamship Co., was the sole excuse given for masters and mates leaving the vessels of the steel corporation.

Back of this matter, however, there was considerable dissatisfaction on the part of both the corporation and the masters. The latter claim that gradually, in recent years, their authority, especially in the employment of mates and engineers, has been taken from them, these men being engaged directly by the officers of the Pittsburg Steamship Co. The masters also complain of numerous small matters, including the elaborate reports of various kinds and detailed records which they are required to keep. On the other hand, the company does not relish the idea of the masters being members of a union, but feels that the masters, being in charge of the vessels, should represent the company, just as a superintendent of a steel plant does, and be responsible in no way to a union. Officers of the company have recently conferred quietly with some of the masters concerning their abandonment of the union. For this reason, and also because the company has shipped about all the ore it needs for this season, Manager Wolvin was not in a mood to grant unreasonable demands of masters and pilots and has ordered the steamships out of commission as they arrived at Lake Erie ports.

A new complication arose a few days ago, when the Pittsburg Steamship Co. arranged with several other vessel owners to have their steamships tow the barges of the steel corporation fleet. The Masters' and Pilots' Association threatened to call off masters and pilots of all vessels towing such barges and in one or two cases there has been wrangling about taking the lines of barges, but as yet no captain has refused to do so. At a meeting of vessel owners, held Sept. 22, at which all the Cleveland owners were represented, it was decided to take the barges even if it caused a general tie-up. The following was adopted:

"Whereas, the present strike on the Great Lakes seems to be without cause or justification; and

"Whereas, it is important for the future carrying trade on the Great Lakes that the owners of the vessels should unite in all proper manner and insure a successful continuation of their business without vexatious interruptions; now be it

"Resolved, That the owners here assembled pledge one another to united action even to the extent of laying up their boats if necessary; and be it further

"Resolved, That a committee of five to devise ways and means be appointed by the chair."

The members of the committee appointed are: A. B. Wolvin, J. C. Gilchrist, C. L. Hutchinson, J. H. Sheadle and H. Coulby. It was also decided that all masters be ordered to report to owners' offices in Cleveland as soon as their vessels arrive at Lake Erie ports, the object being to determine whether the men intend to stay on their vessels or obey the commands of the union. It is known that the better element of the captains is strongly opposed to the action of the union. A number called Tuesday at the office of the Pittsburg Steamship Co. to talk over the situation with the company's representatives. They were disposed to take a reasonable view of the matter. The action of the union up to date was taken by the executive committee without the approval of the advisory board, whose members were sailing when the agitators on land were in session. A meeting of the union is being held as this article is written and definite action may be taken, which may improve or still further complicate matters.

About two-thirds of the 16,430,000 tons of ore shipped this season up to Sept. 1 belongs to the United States Steel Corporation. More than one-third of the vessels of its fleet are now out of commission, and even if the barges are towed by other companies, there will be a large curtailment of shipments for the remainder of the season. It will be remembered, however, that last season the steel corporation brought down about 25 percent more ore than it required for the year, probably mindful of the possibilities of just such emergencies as the present one.

A COUNTER-MOVEMENT IN THE MILLER CASE.

The controversy that has arisen in labor circles over the action of President Roosevelt in the now celebrated Miller case has prompted an Indianapolis manufacturer to take the matter up from the employer's and free workman's side. The following letter to Commissioner DuBrul, of the N. M. T. A., is self-explanatory:

INDIANAPOLIS, IND., Sept. 21, 1903.

MR. E. F. DUBRUL,
Commissioner National Metal Trades Association,
Cincinnati, Ohio.

Dear Sir: The unexampled gall that organized labor is again displaying, through the action of the Central Labor body at Washington, in denouncing the President for his course in the Miller case, and calling on organized labor the country over to bombard the President with petitions, it seems to me calls for some action on the part of employers to counteract this move. For there can be no doubt that it is possible for organized labor, through the course it proposes to take, to wield some influence favorable to its demands, if unchallenged by the respectable element that wants fair play.

Does it not strike you that this Miller incident presents an opportunity for employer and non-unionist to go on record and deluge the President with letters endorsing his course? The National Metal Trades Association ought to become active in this, as should every other similar body.

A letter of commendation will go to the President signed by one hundred of our non-union men, and I don't doubt that non-union men in every one of our members' shops will take similar action if the matter is brought to their attention.

There is no question in my mind that the President's course is largely responsible for the reaction that has set in against the abuses of organized labor, and he ought to be encouraged, and the fact emphasized that the country is with him on this question.

Yours truly,
INDIANAPOLIS DROP FORGING CO.
(Signed) FERD BARNICKOL,
Vice President and General Manager.

O'CONNELL'S SOUND ADVICE.

James O'Connell, president of the International Association of Machinists, has issued from the headquarters of that organization, Washington, D. C., a circular letter to the 100,000 members of the association in the United States and Canada, advising them to be extremely cautious in making demands on manufacturers for higher wages or shorter hours at this time. He declares that serious trouble and probable industrial paralysis are likely to follow any great demands on the part of the machinists. President O'Connell calls attention to conditions which prevail in this country, and asserts that manufacturers in many localities have found it difficult to pay union wages and compete with other manufacturers.

He further says that many of these manufacturers have endeavored to meet these conditions by reducing their force of workmen and by attempting to reduce wages or increase the hours of work.

"In view of these conditions," says President O'Connell, "officers of local lodges will see that it is necessary to adopt a conservative policy in dealing with the manufacturers. There should be no hasty and inconsiderate strikes called and everything should be done to preserve the most harmonious relations with employers."

A NON-UNION EMPLOYE MURDERED.

William H. Collins, a non-union employe of the Parry Carriage Mfg. Co., Indianapolis, was assaulted Sept. 20 by a union hod carrier named Davis, and died the following day. The witnesses say that the trouble began in a discussion of unionism, which Collins tried to avoid. This so incensed Davis that he struck Collins with a club. The Parry employes recognize the murderous attack as a direct result of the many threats of labor leaders, including Samuel Gompers, to unionize the plant in which they are employed. They say

nearly every man in the plant has been approached since Gompers was here and has been asked if he would not join a union if one was formed among the Parry employes. As a rule the employes have replied that they did not want to join a union. These refusals have been followed by threats.

CANADIANS FOR FREE LABOR.

The Canadian Manufacturers' convention, which has just closed its session at Toronto, devoted much attention to labor questions. The keynote was sounded by the retiring president, Cyrus A. Birge, when he said:

"I venture to say that there is no manufacturer within the sound of my voice who is not willing to hear any legitimate grievance presented by his employes, and willing to deal with it upon its merits. There are rights, however, which are sacred to every British citizen, and these must be maintained, and there are questions which permit of no argument or compromise. The workingman of Canada must never forfeit his right to sell his labor where he desires. The employer of Canada must correspondingly be free to purchase without interference such labor as he requires. The value of labor must be fixed by the capability of the seller. In justice to our best workingmen, capability must not be handicapped by incapacity. It is our duty as citizens not only to defend our own rights but to defend the rights of our workingmen. On these principles we must stand or fall together."

The special committee appointed at the convention of 1902 to inquire into labor questions submitted its report. No reasonable employer, the report said, would refuse to discuss with his workmen the issues of shorter hours or higher wages, but the perverted province of labor unions extended far beyond these questions. Why should any body of men be permitted to unionize the shop or factory of his employer? In every trade or community there were many who were opposed to unionism and who stood for freedom of contract. This was their right. Yet the demand of unionism was to compel a man to join the organization or leave the shop. Why should organized labor be permitted to limit the number of apprentices? Young Canadians were every day prohibited from learning the trades for which they were naturally fitted. Then, again, why should organized labor be permitted to control and limit the output of our factories? Three times had a bill been introduced into the Canadian Parliament to legalize in every trade a label which meant the boycott of the goods manufactured by the free workingmen of Canada. Today industrial progress was retarded and thousands of dollars lost because certain workingmen refused to use or work upon the honest goods turned down by their free fellow workingmen. And newspapers were published slandering as "unfair" certain manufacturers and their employes who have had the courage to assert and hold out for their individual rights. Innocent women and children were branded with the vilest epithets and subjected to the meanest social injustices because their relatives did not belong to some certain labor organization. The cause of these conditions was ascribed to the fact that labor organizations in Canada were irresponsible bodies before the law. Another cause rested in the encouragement given to labor unions and their methods by politicians.

This was, above all else, to be regretted, that for fear of offending organized labor, politicians, entrusted with the welfare of the citizens of this country, were standing today as witnesses of these conditions, and instead of retaining a free hand to control the situation from an impartial standpoint, they were actually confiding to ardent and prejudiced labor leaders positions of trust in the very departments dealing with these matters.

The convention adopted the following declaration of principles:

1. The Canadian Manufacturers' Association is not opposed to organized labor as such, but is unalterably opposed to illegal acts of interference with the personal liberty of employer or employe.

2. The Canadian Manufacturers' Association disapproves of strikes and lockouts and favors an equitable adjustment of all differences between employers and employes by any amicable method which will preserve the rights of both parties.

3. No person should be refused employment in Canada, or in any way discriminated against on account of membership or non-membership in any labor organization, and there should be no interference with any employe who is not a member of a labor organization by members of such organization.

4. With due regard to contracts, it is the right of the employe to leave his employment whenever he desires, and it is the right of the employer to discharge any employe when he sees fit.

5. Employers must be free to employ their work people at wages mutually satisfactory without interference or dictation on the part of individuals or organizations not directly parties to such contracts.

6. Employers must be unmolested and unhampered in the management of their business in determining the amount and quality of their product, and in the use of any methods or systems of factory management which are just and equitable.

7. In the interest of employes and employers of the country, no limitation should be placed upon the opportunities of any person to learn any trade to which he or she may be adapted.

8. The Canadian Manufacturers' Association believes that Canadian labor unions should be incorporated national organizations, governed by Canadian officials and free from foreign control.

ORGANIZING WILL PROCEED.

It was decided at the meeting of the Executive Committee of the National Association of Manufacturers, held in New York Sept. 18, that the work of organizing the employers of the United States, to place them in a position to cope with organized labor, should begin without delay. President Parry was given full power to proceed at once in the matter, and within a few days will issue a call, asking all trades and employing associations, citizens' alliances, manufacturers' clubs and associations and all business organizations in general to elect delegates to a convention at which shall be taken the preliminary steps toward forming a national federation or association of employers, composed of the organizations named.

This is the development of the suggestion made by President Parry at the New Orleans convention of the National Association of Manufacturers. It is the belief of the association that it is time to act without delay, and that the plan decided on is the best method of getting at the union labor problem.

LABOR NOTES.

A labor union which has as a fundamental principle opposition to all strikes and which favors settling disputes with employers by arbitration has been organized in St. Louis. The organization is to be known as the Independent Brass Workers. Delegates representing the brass workers in New York, Chicago, Philadelphia, Cleveland and other cities met the local craftsmen Sept. 20 in a conference which resulted in the formation of the union. A declaration of principles was drafted and submitted to a committee that will report at the next meeting to be held in Chicago Thanksgiving day. In the declaration the members are pledged to not inaugurate a strike and all will be required to take the oath of allegiance to the United States. The new union will be independent of other labor organizations.

The Morse Iron Works & Dry Dock Co., of Brooklyn, and the Burlee Dry Dock Co., of Port Richmond, Staten Island, are suing presidents of several lodges of the International Association of Machinists for $20,000 each because of damages caused by strikes ordered by the defendants among the plaintiffs' workmen during the summer.

After a long debate the Central Federated Union, of New York City, suspended the Blacksmiths' and the Blacksmiths' Helpers' Unions for failure to obey an order of the central body issued two weeks ago to repudiate an agreement which they signed with the New York Metal Trades Association. The agreement that got the blacksmiths into trouble provided that there should be no sympathetic strikes in trade disputes and was entered into while conferences were going on regarding the general strike of the marine machinists for a minimum wage rate of $3 a day.

The International Association of Bridge and Structural Iron Workers is in session this week in St. Louis. Sam Parks, the notorious walking delegate of New York, is making a fight on Frank Buchanan, president of the association,

on account of the recent suspension of New York's union, No. 2, by President Buchanan.

Eighty employes of the Pennsylvania Steel Co., at work on the erection of an open-hearth building at the Central Iron Works, Harrisburg, Pa., are on a strike, because of the refusal of the steel company to discharge some non-union workmen.

The strike at the Jefferson mill iron plant of the American Car & Foundry Co. is still on, with conditions exactly as they were when the strike was started Sept. 8. Sept. 19 was pay day, and the men were given the money due them.

On Friday, Sept. 25, a committee of the Amalgamated Association, consisting of seven members appointed from the largest lodges of the organization, will meet in Pittsburg for the purpose of investigating the charges preferred against President Shaffer. From two very important conferences of the association, one held at Cleveland, and attended by all of the vice presidents, and the sheet conference in Pittsburg, President Shaffer was absent. At this hearing he will have an opportunity of explaining. Vice President George F. Harbin, of the Sixth District of the Amalgamated Association, including Youngstown, O. mills, has been relieved from the duties of his office for the non-payment of dues.

The boilermakers employed in the Big Four shops in Delaware, O., went out on strike Sept. 22 because of the refusal of the road to grant them an increase from 30 to 35 cents an hour. No difficulty was experienced in securing men to fill the strikers' places.

Eastern Furnaces to Restrict Output.

(Special Telegram.)

NEW YORK, Sept. 23.—Representatives of Eastern furnaces met in this city yesterday to consider some steps proposed in view of the present condition of the pig iron market. Those in attendance were principally members of furnace companies in New Jersey and the Lehigh and Schuylkill Valleys, the combined output represented being about 5,000 tons daily. It was the general sentiment that production should be restricted, with furnaces in each locality working in harmony as to the time and extent of the restriction. It is expected that production will be curtailed at least 10 percent for the next three months. The possibilities of wage reductions are also a factor, but there is to be no concerted action on this point. The furnaces represented in the movement will not organize into an association, nor will any attempt be made to fix prices, past efforts in this direction having proved of little avail.

Pencoyd Works Shutting Down.

On Friday and Saturday of last week 500 men in the rolling mills of the Pencoyd Iron Works, Pencoyd, Pa., were laid off, and it is considered likely that many more will be let out in the near future, possibly to the extent of making 3,000 men idle. President Charles Major gave the following statement to Philadelphia papers:

"There is a probability of the steel and rolling mills at Pencoyd shutting down for lack of orders. This lack is due to labor troubles. The American Bridge Co., which gets most of the material made at Pencoyd, has twenty thousand tons of fabricated material at New York awaiting opportunity to erect it. There may be found several hundred cars in Jersey City waiting to be handled. The rolling mills at Pencoyd have enough orders to run for two weeks. It will depend upon receipt of orders for material whether these mills will have to close down entirely or not. Other departments of the works at Pencoyd have work for a longer period."

Five of the hot mills of the South Sharon, Pa., plant of the American Tn Plate Co. resumed operations this week, and the remaining fifteen mills will resume operations as soon as repairs can be made. During the shut down several sets of new cold rolls have been installed and five new tinning stacks have been built.

The coal land contest between the Government and the Colorado Fuel & Iron Co., which has occupied the attention of the Pueblo Land Office and the Washington authorities for the last four months has been settled by compromise. The steel company will pay $20 per acre, the price asked for the coal land, instead of $2.50 paid for timber and stone land claims. It is understood the Colorado Fuel & Iron Co. will pay about a half million dollars. The Victor Fuel Co. has also settled with the Government on the same basis on a large number of coal land claims taken up under the timber and stone act.

Speyer & Co. Will Foreclose Mortgage.

The Consolidated Lake Superior Co. being unable to raise the money to pay off the mortgage of Speyer & Co., foreclosure proceedings are now imminent. The Speyer loan is for $5,500,000 and was due last July. Charles H. Tweed, representing the Speyer syndicate, said:

"We have been lenient with the company. We will probably foreclose the loan, selling the collateral pledges with us at auction. The syndicate will seek reimbursement for its outlay."

As roughly estimated by Vice President Sanborn, the properties are likely to go for $10,000,000. These are properties against which securities of the par value of $100,000,000 were issued, and in which, according to official statements, $30,000,000 in actual money has been invested.

F. H. Clergue has been at the Soo within a few days with several Englishmen, inspecting the Copper Reduction Works, recently completed, which, it is understood, he desires to acquire. He is said to have men exploring the Sudbury district for desirable property.

Car Wheel Consolidation.

The National Car Wheel Co., of Rochester, N. Y., a consolidation of seven of the largest car wheel plants in the East and Central West, has been incorporated with a capital stock of $9,000,000 at Albany, N. Y. The directors of the company are Frank D. Russell and Charles P. Chapin, of Rochester; Charles A. Maher, of Cleveland; Charles V. Slocum, of Pittsburg; William T. Goodnow, of Sayre, Pa.; James R. Burnett, Howard C. Smith, Forsyth Wicks and Beverly R. Robinson, of New York. The following plants are included in the consolidation: Rochester Car Wheel Co., Rochester, N. Y.; Maher Car Wheel Co., Cleveland, O.; Cayuta Wheel Co., Sayre, Pa.; Keystone Car Wheel Co., Pittsburg; Ramapo Car Wheel Co., Ramapo, N. Y.; Maryland Car Wheel Co., Baltimore, Md.; and the New York Car Wheel Works, Buffalo, N. Y.

To Handle Steel Corporation Exports.

The constituent companies of the United States Steel Corporation have organized the United States Steel Products Export Co. for the purpose of handling and further developing the export trade of these companies. J. A. Farrell, at present general sales agent for exports of the American Steel & Wire Co., has been made general manager of sales. During the past two years the American Steel & Wire Co. and the National Tube Co. have done a big export business, but the other companies of the steel corporation paid no attention to the export trade owing to the heavy home demand. With the falling off in home consumption an outlet for steel products is to be established abroad and the export trade is to be greatly developed. This new company will handle all exports and a big saving in ocean freight rates is expected by making shipments for all the companies thus making it possible to charter vessels for combined shipments.

The United States Steel Products Export Co. expects that finished products will form the main portion of its business, as there is now little or no chance to compete abroad with raw material or the semi-finished product. Latest advices from England are that German billets are delivered at Manchester at $21.50 to $22, and American steel to compete with this would need to be sold at $16, Pittsburg. But even at this price, efforts by the steel manufacturers to place steel in British markets would undoubtedly be met by still further concessions on the part of the German syndicate.

POSITION OF INDEPENDENT IRON ORE PRODUCERS.

In view of the absorption of iron mines and iron ore deposits by the United States Steel Corporation, it is suggested that the independent producers may be obliged to form a union of some kind to save themselves from being driven out of the market, or being forced to depend upon their great rival for ore. The two alternatives would probably lead to the same end, giving the corporation absolute control of the iron trade. As matters stand at present, no single independent concern can oppose the trust in the competition for mines. Its command of capital, and of means of transportation also, enables it to secure properties easily, and to shut out others when it may seem expedient. The prices paid may be high, but the ore is secured.

A combination of the independent iron and steel concerns, on the one hand, and of the independent ore producers on the other, seems to have many points to recommend it, even if it is not absolutely necessary. The main difficulty would be in the preliminary arrangements, and in limiting the combination to the single purpose of supplying ore. Many of the mine operators would welcome some arrangement of the kind, which would secure them a market for their output. At present, they can find that; but with any marked curtailment of iron production, the trust might find it expedient to keep its mines open and sell ore, rather than to disband its forces and close some of its mines.

This suggestion—which is not original with us, but comes from a mine operator—certainly deserves consideration. We do not indicate, at present, how it can be carried out. Much planning of details and adjustment of various interests would be required. Some independent concerns already own mines, and might be reluctant to joint in such a movement, holding themselves already safe; but some organization could be formed without them, to which they might probably be willing to adhere at a latter time.—[Engineering and Mining Journal.

The Iron Trade Still Prosperous.

In the current issue of the *Bulletin*, General Manager Swank makes the following editorial comment, in evident rebuttal of the belief entertained in some quarters that the iron trade must either be in a state of boom or of extreme depression:

It has been recognized for some time that the boom in the iron trade of this country which began with the early weeks of 1899 has come to an end. It would be chronologically correct to say that it ended with the close of the first half of 1903, when it became evident to all observers that the urgent demand for iron and steel in nearly all forms was slackening and that some iron and steel prices were weakening. These indications of the subsidence of a boom that was then exactly four years and a half old have since been still more noticeable. But it is an error to assume that the end of the boom means an end of prosperity for the iron trade. Consumption still continues at an enormous rate, few works have been closed even temporarily by a lessened demand for their products, and prices are simply being adjusted to more normal conditions. This is the whole story up to the present time. We see no occasion for apprehension about the immediate future. The remainder of this year promises to be a busy period for nearly all our iron and steel manufacturers and for those who furnish their raw materials. Last year we imported over a million tons of iron and steel because our own manufacturers could not, for various reasons, supply the demand, and imports on old orders are still heavier than we like to see them. We are now able to meet our iron and steel wants. In this fact alone there is great encouragement. Our imports of iron and steel should now rapidly decline and our exports should materially increase.

The F. H. Buhl club building, Sharon, Pa., was dedicated last week and turned over to the city of Sharon by its donors, Mr. and Mrs. F. H. Buhl. In addition to a library of 6,000 volumes the building contains a gymnasium, billiard and pool rooms, bowling alleys, smoking and lounging rooms. The cost of the club house complete is estimated at $250,000, while the cost of its maintenance is estimated at $16,000 annually.

GERMAN OPINION OF AMERICAN COMPETITION.

At the instance of the Association of German Iron and Steel Producers and Allied Societies, Messrs. Luez and Boeker, of Dusseldorf and Remscheid respectively, recently paid a visit to the United States for the purpose of investigating the American conditions of producing iron and steel and constructing machinery in order that German firms might be made acquainted with the position of affairs and the probability of American works becoming serious competitors in European markets in the near future. The opinion of Mr. Boeker is that although there is little danger of the American companies offering severe competition in the case of pig iron, it is extremely probable that they will endeavor to dispose of abroad at low prices quantities of rails, steel bars, constructional iron and steel, sheets and wire immediately on a reaction taking place in the home industry. The Transatlantic works will the better be able to do this as a result of the present production in bulk, the extended use of automatic machinery, and by the cheap supplies of coal. In these circumstances Mr. Boeker entertains the view that Germany requires a protective duty of a lasting character against this American danger. Nevertheless, he suggests that the German works should copy the Americans by introducing labor-saving machinery as far as possible so as to reduce the cost of production, and also by the specialization of branches of manufacture. Mr. Luez, who confirms the previous observations in regard to competition in iron and steel productions, adds that the Americans possess, apart from the natural mineral deposits, material advantages in consequence of the low freight rates due to the co-operation of the railways, canals, and shipping companies. In the case of machinery he states that the German machines are equally as good as those made in the United States, and that the cost of production is practically the same, differences only arising where the American works construct machines in bulk—that is to say, repetition work on a large scale. The two experts agree in the general statement that the so-called American danger has been exaggerated, at all events in relation to European markets.

Coal Production in Germany.

The production of coal in Germany in the first seven months of this year was 65,847,206 tons, as compared with 60,228,861 tons in the corresponding period of 1902; of lignites, 25,205,385 tons, as compared with 23,623,831 tons; of coke, 6,535,765 tons, as compared with 5,054,359 tons; and of briquettes, 5,740,645 tons, as compared with 4,992,619 tons. There was accordingly an increase of 5,618,345 tons in the output of coal in Germany to July 31 this year, an increase of 1,581,554 tons in the production of lignites, an increase of 1,481,406 tons in the production of coke, and an increase of 748,026 tons in the production of briquettes. To the coal, lignites, coke and briquettes produced in Germany in the first seven months of this year, Prussia contributed 61,472,520 tons of coal, 21,077,596 tons of lignites, 6,493,026 tons of coke, and 5,025,603 tons of briquettes. The extraction of the Breslau district in the first half of this year was 14,276,793 tons, as compared with 13,735,312 tons in the corresponding period of 1902; of the Halle district, 3,783 tons, as compared with 5,057 tons; of the Klausthal district, 334,847 tons, as compared with 324,046 tons; of the Dortmund district, 30,662,278 tons, as compared with 27,613,340 tons; and of the Bonn district, 6,330,321 tons, as compared with 5,916,813 tons.

The Hammond Iron Works, one of the largest industries of Warren, Pa., was totally destroyed by fire Sept. 21, entailing a loss of $75,000, and throwing 200 men out of employment. The origin of the fire is not known, but suggestions of incendiarism are freely made, several recently discharged employes having publicly threatened to "get even." The buildings were filled with costly machinery. In the office building, also destroyed, were thousands of dollars' worth of patterns. The loss is partially covered by an insurance of $35,000. Work of reconstruction will be at once undertaken. The Hammond Iron Works was organized in 1900, the principal owners being William Hammond, of Warren, and Thomas H. Hammond, of Williamsport.

THE BRITISH IRON MARKET.

The position in the iron and steel trades is now, perhaps, hardly so strong as it was last week, and the slight improvement which then took place has been barely maintained. There has been an easing down in warrants, both Scotch and Cleveland brands, and in other directions prices have a weaker tendency, while there are no lacking instances in which they are quotably lower. At the same time, there is no general change, and some classes of material are firm at recent prices, while others have a stronger tendency. Business, for the most part, continues to be of only moderate dimensions, and the improvement which was expected in the pig iron trade this month has not yet made its appearance, with the result that there is a good deal of disappointment among makers, which is responsible, perhaps, for the rather weaker aspect of the situation. The demand for finished iron and steel varies a good deal, according to the class of material, but is, on the whole, not very active.

Pig Iron.—In this branch of the iron and steel trade there has been a rather weaker tone since our last. This has been marked in the Cleveland district, where warrants have declined to lower figures than have been known for over a month, and, although makers' iron has not followed this decline to its full extent, No. 3 foundry is 6d per ton cheaper on the week, while No. 4 is also down. Business in ordinary Cleveland iron, however, is fairly active in this district, although there has been no improvement, as was expected; and there is very little in the way of stocks, except that in the warrant stores. In some other districts, the better tone reported last week has been maintained. Lancashire prices, for instance, remain without quotable change, 53s 6d net being about the average figure for No. 3 foundry, while the list basis of Lincolnshire manufacturers remains unchanged, and, in some instances, they are securing 6d above it. Derbyshire brands have also been firming up, and the low-cut quotations of a few weeks back are unobtainable. Hematite iron is dull, and for East Coast varieties prices are easier, owing to the depression in the local steel trade, and the position of producers is rendered more difficult by the price of rubio ore which the Spanish mine owners are keeping up, the c. i. f. price at Middlesbrough being 15s 4½d.

Public stores stocks in tons:

	Sept. 10, 1903.	Sept. 11, 1902.	Increase or Decrease.
Connal's at Glasgow.....	12,650	41,700	—29,050
Connal's at Middlesbrough.	134,200	127,900	+ 6,300
Connal's at Middlesbrough, hematite	300	300	.....
West Coast hematite.....	16,800	28,200	—11,400
N. E. R. Stores Middlesbrough	.....	.....	.....
Totals.....	163,950	198,100	34,150 Net decrease.

Manufactured Iron and Steel.—The market for finished material has some favorable and some unfavorable features, and it is not easy to decide which predominate, although, unfortunately, it is to be feared that the latter are the more numerous. Shipbuilding material remains in very weak demand, both in the Clyde and in the North of England. On the Tees, however, steel ship plates remain at £5 12s 6d and iron ship plates at £6 10s, as makers cannot see their way to reduce prices unless they can get cheaper raw materials. Steel ship angles in the same center, are at £5 10s, and iron ship angles at £6 5s. Rails, too, are not so active as they were, and, in Middlesbrough, are now obtainable at £5 for heavy varieties, while cast iron railway chairs have been reduced to £3 10s. In other branches of the trade, however, there is a more satisfactory state of affairs to report. In iron bar trade seems to be holding its own well, and in Lancashire, although the associated makers have made no change in their list rates, merchants, who have been under-quoting, have leveled up their prices to the official standard. Lancashire bars, delivered Manchester, are now firm at £6 8s up to £6 10s; with North Staffordshire qualities at £6 10s to £6 15s. Steel billets are in rather more demand, and the fact that German material of this class is stiffening in price, is a sign of the state of the market. Lancashire billets range from £4 12s 6d to £4 13s 6d, and German from £4 8s to £4 10s. In South Staffordshire, too, there is a stronger tone. Orders for larger lines were forthcoming in several branches of the trade, and common bars were realizing 2s 6d per ton more than last week.

	Sept. 10, 1903	Sept. 3, 1903	Sept. 11, 1902
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough.....	15 6	15 6	16 0
" Cardiff.....	14 6	14 6	14 3
Pottery Mine, N. Staffordshire.....	20 6	20 6	20 6
Hematite, West Coast (at mines).....	16 6	16 6	16 0
PIG IRON—			
No. 3 foundry, Middlesbrough.....	46 6	47 0	53 3
Cleveland basic iron, mixed numbers	49 0	49 0	55 6
Warrants.....	46 3½	46 10½	53 4½
Scotch warrants, Glasgow.....	—	51 7½	57 9
Hematite warrants, W. Coast.....	55 5	56 0	60 11
Cold blast (foundry), S. Staffs.....	105 0	105 0	105 0
Welsh hematite.....	58 0	58 0	63 6
MANUFACTURED IRON AND STEEL—	£. s. d.	£. s. d.	£. s. d.
Marked bars, S. Staffordshire.....	8 10 0	8 10 0	8 10 0
Common bars.....	6 10 0	6 10 0	6 15 0
Steel rails, Middlesbrough.....	5 2 6	5 5 0	5 10 0
" West Coast	5 10 0	5 10 0	5 10 0
" Cardiff.....	5 5 0	5 5 0	5 7 6
Steel angles (eng.) Middlesbrough....	5 15 0	5 15 0	5 17 6
" " Glasgow	5 7 6	5 7 6	5 12 6
Steel plates (ship), Middlesbrough....	5 12 6	5 15 0	5 15 0
" " Glasgow.....	5 15 0	5 17 6	6 0 0
" (boiler), Glasgow.....	6 0 0	6 0 0	6 7 6
Tinplates, Bessemer I. C. cokes, South Wales.....	s. d. 12 6	s. d. 12 6 to 12 9	s. d. 13 0

[London Iron and Coal Trades Review, Sept. 11.

Personal.

E. P. Prentice has been elected a vice president of the Colorado Fuel & Iron Co. He is a son-in-law of John D. Rockefeller. Mr. Prentice, it is stated, will have charge of the legal interests of the company.

Geo. G. Blackwell, chairman of Geo. G. Blackwell, Sons & Co., Ltd., of Liverpool, Eng., who has visited the United States several times in recent years, in the interest of his firm, sailed again for this country Sept. 19. He will land at Boston in the latter part of the month and will visit the various iron and steel centers.

John M. Stetter has accepted a position with the Youngstown Mfg. Co., Youngstown, O., as superintendent of its bolt and nut department. He was formerly superintendent of the Muncie works of the Republic Iron & Steel Co.

Lawrence C. Phipps, of Pittsburg, Pa., and Veryl Preston, of New York, second vice president of the United States Steel Corporation, returned from Europe last week on the Oceanic.

William Bletso has been appointed master mechanic of the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., to fill the position made vacant by the death of James Matthews.

John K. Weir has resigned as assistant superintendent of the Valley plant of the Republic Iron & Steel Co., Youngstown, O., and has accepted the appointment of infirmary director of Youngstown.

William Nicholl, of Detroit, has sailed for Berlin to assume the position of manager of the Berlin office of the American Radiator Co. He is not yet 20 years of age.

Owing to the sudden death of H. C. Vansant, Philadelphia, manager of sales of the National Tube Co., the New York and Philadelphia sales departments have been consolidated under the jurisdiction of Clifton Wharton, Jr., New York manager of sales with offices both in New York and Philadelphia.

After several unsuccessful attempts by the assignee of the Weaver-Hirsh Foundry & Machine Shops, Allentown, Pa., to sell the property, it has finally been disposed of to the trustee for the bondholders for $25, subject to a mortgage of $65,000.

The plant of the Jackson Tin & Sheet Rolling Co., Clarksburg, W. Va., will resume operations about Oct. 1. The plant has been shut down for about six months.

NEW BORING AND TURNING MILL.

The Rogers Machine Tool Co., of Alfred, N. Y., has redesigned its line of vertical boring and turning mills, and we illustrate one of these machines, a heavy pattern 62-inch mill.

This tool is entirely self contained and embodies many new features, special attention being given by the designers to

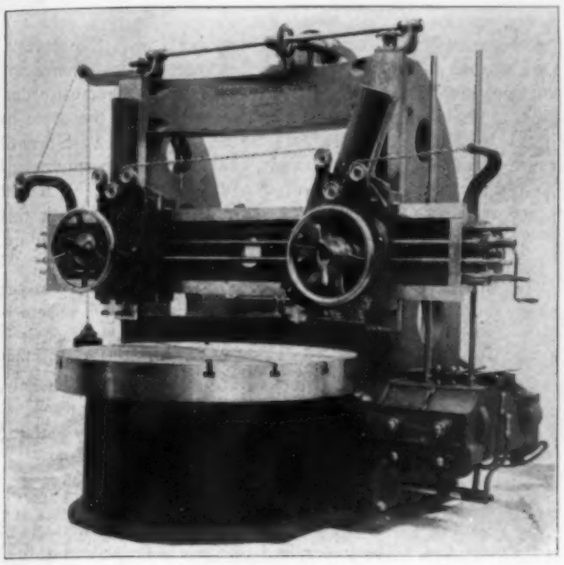


FIG. 1.—A NEW BORING AND TURNING MILL.

strength, power and rigidity, in order to meet the demands of modern boring mill practice, and the tool is adapted to the use of high speed tool steel.

One important advantage of this machine is in the fact that it can be changed from belt to motor drive at very little expense, as the driving arrangement is composed of a cluster of gears, so proportioned as to give a greater range and more changes of speed than formerly obtained by the use of the cone pulley. The change from belt to motor drive is accomplished by replacing the driving pulley with a gear, which is shown in the rear view. The motor is then mounted on a bracket, securely fastened to the frame.

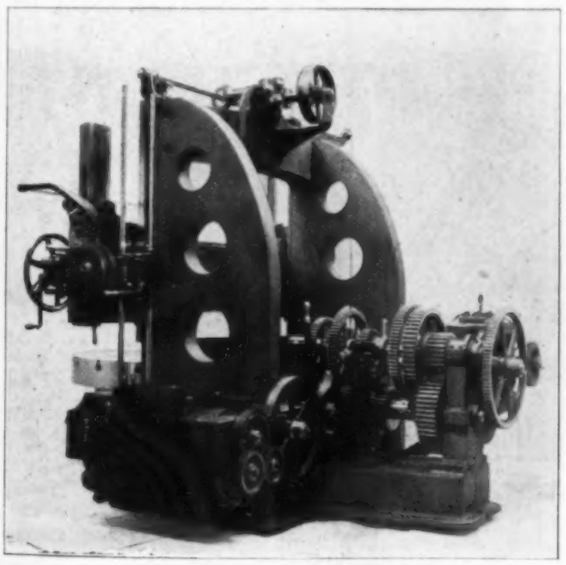


FIG. 2.—REAR VIEW OF NEW BORING AND TURNING MILL.

The table is supported by a spindle with a massive V-shaped bearing of large diameter.

The foot brake, which enables the operator to stop the table in any desired position, is one of the features which has been retained from the earlier machines.

The cross rail has a belt lift, so connected that only the pulley shaft need be run when raising or lowering the rail.

Positive geared feeds are used, which are operated by levers, and each head is independent in the amount and direction of feed. The feeds are easily operated, the levers being convenient to the operator's hand. A liberal amount of steel is used to avoid breakage in places subjected to the greatest shock.

The machine can be readily fitted at any time with a screw cutting or drum grooving attachment.

The makers apply electric motors of anywhere from 12 to 18 horsepower to the 62-inch two-head mill. The size of the motor being governed by the work which the mill is required to handle.

There are twenty-four changes of speed, from 20 to 800 feet per minute as measured on a 62-inch circle, and there are twelve changes of feeds on each head ranging from 1-36-inch to ¾-inch horizontally, and 1-54-inch to ½-inch vertically.

Pennsylvania Furnaces Stopping.

(Special Correspondence.)

HARRISBURG, PA., Sept. 22.—The depression of prices for pig iron has caused a suspension of operations at a number of furnaces which depend upon general trade for their orders, and the stoppage of operations bids fair to be the most extensive within the last three or four years. There are more furnaces idle than there were during the great coal strike of last year, and the managers are not very hopeful of the outlook for the next month or two. A number of companies have stocked up, and others refuse to sell unless they get their price, which is now higher than the market.

The two furnaces at Bellefonte, in Centre county, stopped last week, and were followed by Marshall furnace in Perry county. Leesport furnace was stopped a few days ago, and in Lancaster and York counties the Susquehanna company has suspended work at its furnaces. At Reading two furnaces are working and only three at Lebanon. The Central Iron & Steel Co. will stop No. 1 furnace for relining and the Pennsylvania Steel Co. will suspend its No. 3 furnace for improvements as soon as enough iron is on hand. The company has one of its Lebanon furnaces idle.

In the Lehigh valley there are several idle furnaces, the Thomas and Empire companies having stopped work except where necessary to supply local demands. The Schuylkill Valley furnaces are working, but it is said that some will blow out before the end of the month.

New Iron-Hardening Process.

Phosphorus, as is well known, has the property of imparting a certain degree of surface hardening to iron, but not without producing brittleness. The iron is made to assume a coarse structure, in which the crystals are comparatively loosely bound together. This effect of phosphorus of loosening the coherence of the molecules of the iron greatly facilitates the absorption of carbon by the iron. The carbon rapidly penetrates the iron to a considerable depth, imparting great toughness to the core and nullifying the comparatively slight defect constituted by the inconsiderable brittleness of the surface. Two Prussian inventors apply this principle in their process for hardening iron by heating the same in a tempering powder consisting of organic nitrogenous substances containing a high percentage of fusible ash and employing phosphorus as the medium for the introduction of carbon into the iron. Without prejudicially affecting the welding properties of the iron, it imparts such a degree of hardness thereto that it can neither be cut nor chipped by the best steel used. In order to harden the surface of about 200 kilogrammes (441 pounds) of iron to a depth of 1 millimeter (0.0394 inch) by means of this process, the pieces should be imbedded in a retort, muffle or the like, in bone dust, to which is added a mixture of 300 grains of yellow prussiate, 250 grains of cyanide of potassium, and 400 grains of phosphorus. The receptacle is well closed, luted with clay, etc., and raised to a clear red or white heat, whereupon the material treated is immersed in a glowing condition in a water or other bath.—[Scientific American.

The Haskell & Barker Car Co., of Michigan City, Ind., has purchased a 200-h. p. direct connected unit, from the Ball Engine Co., Erie, Pa.

Some Australian Foundry Experiences.

BY JAMES MUSGROVE.

Numerous descriptions and illustrations of the gigantic and highly equipped home foundries have appeared in your journal, and I have thought a few details of a small concern in a farming district of Victoria, Australia, might, by way of change, be of interest to your readers.

At the present time the agricultural implement and machine business of Australia bids fair to pass into the hands of Ameri-

JAMES MUSGROVE.

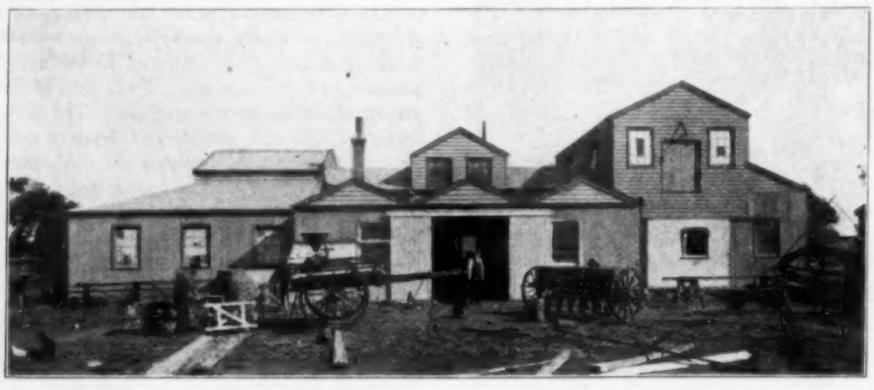
cans, and unless greater energy, greater skill and above all greater exercise of the inventive faculty are developed, the local manufacturer will be extinguished—even now the only lines where the Americans have not secured a foothold, are those which, by virtue of local inventive talent, have grown up as Australian specialties.

Thirty or forty years ago things were very different. Then everything the farmer needed, save perhaps portable engines and threshers, was supplied, and fairly well supplied, by the local maker, and it was then that I as a youth with little training and no capital, save a strong liking for mechanics, commenced my career. Starting with a small forge and self-made bellows and by the exercise of industry and ingenuity, I soon found ample employment in the construction of drays, horse rakes, harrows, field and stack elevators and such work. But my ambition lay more in the direction of machinery, and it was a red letter day when I found myself the proud owner of a six-inch, self-acting and screw cutting lathe. This enabled me to strike out in a new line, the manufacture and repairing of mowing machines, and subsequently the construction of broadcast sowing machines. In connection with these I invented and patented an idea which for a time gave me a monopoly in that special line. Although I had no foundry experience, at an early stage I decided to do my own casting, and erected a small cupola furnace with fan driven by horsepower, which did fair service for several years. As business grew, the first crude sheds gave way to better housing, and the horsepower to a three-horsepower steam engine of novel design made in the shop—and the final outcome is the workshop of which I send you front and rear views.

I will now describe a few points of my foundry practice. I only watched this department a limited time each year and then manned it with my general employes, who, like myself, were trained to work at all branches. As a consequence the molding skill I had at my disposal was not of the highest order, and I soon felt that a mechanical device to take the place of that skill would be of great value—something that would insure clean and proper partings; that would give runners of the right size and best position, and which above all would insure a perfect mechanical draw to the pattern. With this object, about ten years ago I worked out a system of molding, which, strange to say, is almost identical with the one described in your issue of February last as being in use at the great works of the Siemens & Halske Co. at Berlin. There is nothing original in the principles of the system. In fact, it is simply a combination of two systems devised and worked out in England more than a quarter of a century ago, namely, "Jobson blocks," described in the fifth division of Spon's "Dictionary of Engineering" and Wcolnouch & Dehne's molding machine described in Spretson's "Casting and Founding."

As worked out by myself, the machine consists of a base plate with two vertical hollow pillars bolted at ends. Inside these pillars are accurately fitted standards made to rise and fall nine inches. The upper half of these standards is turned to fit the hand at pillars, and the bottom half is square with rack teeth cut on one side. These racks gear with two small pinions keyed on a cross shaft which is turned by a side lever and thus rises and lowers the standards. On the top of each standard is fitted a bearing to take the trunnions of the pattern block frames. The frames for these pattern blocks (which take the place of the usual match plate) are cast from the molding box patterns, with the addition of a strong central rib and trunnions on each end—these trunnions being turned to fit the standard bearings. The boxes as well as the frames are planed on edge and the pin holes are drilled and sockets tapped with a jig so as to secure absolute fit and interchangeability.

The pattern blocks are prepared as follows: The patterns are carefully arranged and bedded in the drag, the parting nicely smoothed and the runners cut with judgment. The patterns are then brushed over with oil; the block frame is put on and filled with plaster of paris mixed to the right consistency. When set the patterns are removed, the plaster face smoothed of all sand, surface-dried and varnished with shellac. If there are core prints or sharp projections in the cope part of patterns, I mold these projections and cast them in white metal with staples or bent rods mounted to afterwards secure them in the plaster. These parts after being filed and polished are put in their places in the drag pattern block, the latter being previously well oiled, the cope frame put on and also fitted with plaster. When set and removed it will bring with it the metal portion, forming a composite but solid cope pattern



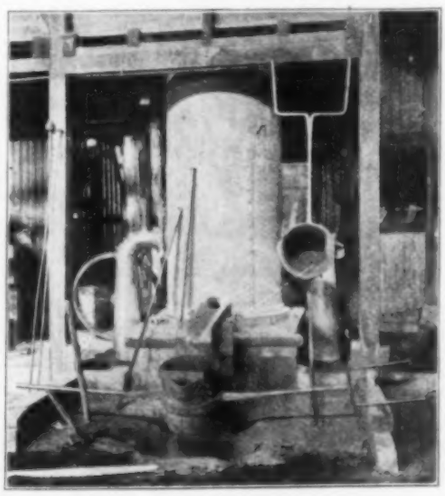
THE GREENVALE IMPLEMENT AND MACHINE WORKS.

block. The blocks are then well dried and varnished; the patterns are put in place in the drag block and secured with screw wires passing through the plaster. When placed on the machines they are ready for molding.

As will be seen from the cut, I use the machines in pairs so as to complete the boxes at once. The procedure is as follows: The molding box is placed on blocks and clamped, sand filled in, rammed and strickled off level with boxes (gate pins are cut just the depth of box). The whole is then turned over on the trunnions and lowered onto the table of machine. Set

REAR VIEW OF GREENVALE FOUNDRY.

screws in bearings are then tightened, trunnions rapped a little with wooden mallet, clamps released and then the pattern block is lifted by depressing the lever, ensuring an absolutely perfect draw. The box is then drawn out on the table which runs on side ends, dusted and removed to the floor. In the cut the parts of plaster blocks are shown with the respective molded boxes below. This particular block carries no less than 15 separate patterns and is provided with whirling gates. I have never been able to get the phenomenal results recorded in the journals, but these machines double the output over hand molding and give better results. They deal particularly well with patterns having irregular partings and with bevel wheels and pinions. There is one feature I have noticed in machine molding. To get the best result the pattern block should be slightly higher in temperature than the molding



CUPOLA AND SKIMMING LADLES.

sand. If lower in temperature, moisture condenses, and clogging sets in, giving trouble in brushing and cleaning patterns. If the mold is too hot the sand crumbles, but there is a certain difference, about ten degrees, where there is no adhesion and the results are perfect.

The other cut shows my cupola which is 18 inches internal diameter, 18 inches to center of tuyeres and 8 feet to charging door. I see some of the American experts, notably Edward Kirk, advocate very low tuyeres, even lower than 6 inches. This is not in accordance with my judgment. I find 18 inches none too much to collect and mix metal, and even at that have had the misfortune on more than one occasion to have an overflow into the tuyeres. In the cut of the furnace will be seen the ladles which I have introduced to show the skimming spouts I use. These have been advocated before in the *Foundry*. A piece of flat bar is bolted across the ladle a little distance in front of the lip and to this bar is riveted a sheet iron carrier as guard, pierced with large holes and depending some distance into the ladle. In daubing the ladle the material is pressed on each side of this support and formed so as to give a suitable pouring spout between it and the lip. In practice this takes little more time than daubing the plain ladle. I can vouch for the efficiency of this spout, having used it for several years. It gives no trouble; no skimmer is needed to attend the ladle and get in the way. In pouring, the metal is taken as it should be from the bottom, and the slag is retained on the surface to the last. In conclusion, I would say to American founders, Try it.

MOLDING MACHINES.

Lower Freight Rates.

Taking effect Oct. 1, the rates on pig iron from Cleveland to southern and central Ohio points will be reduced. The rates will be changed to the following basing points: (we give the present and new rates for comparison)

From Cleveland, O., to Columbus, O., present rate, $1.40; after Oct. 1, $1.10.

From Cleveland, O., to Springfield, O., present rate, $1.50; after Oct. 1, $1.15.

From Cleveland, O., to Dayton, O., present rate, $1.50; after Oct. 1, $1.25.

Some furnaces are offering to sell their coke contracts and the presumption is that they are going out of blast, although they have not declared that to be their intention.

Power Plant Design.*

BY R. W. STOVEL.

If we agree that the best power plant to supply certain definite power requirements is that one which at the end of a term of years, say ten, has supplied these requirements for least expense, including first cost, operation, supplies, maintenance, repairs, renewals, delays and present value, we can divide the problem into two parts.

The first part is the determination of the requirements and the second part is to find the ultimately cheapest way of supplying them.

The requirements are determined by the owner, assisted by the engineer, who should see that no steps in the manufacture which can be economically performed by power are omitted, that the most suitable forms of power are considered for the different processes, that the work is arranged or routed properly and above all that adequate allowances are made for growth.

The requirements being determined the different methods of power application should be considered and decision made whether it is more economical to install isolated power units or to transmit steam from a central boiler plant with steam engines located at different points throughout the area to be supplied or to install a central generating plant and transmit some form of electrical energy and develop power where required by electrical motors. If the latter method is found more suitable, the form of electrical energy must be determined, whether direct current at some voltage or whether alternating current shall be used, and if the latter, what frequency will be used, at what voltage we will generate, at what voltage we will transmit and to what voltage we will transform down for use at the motor terminals.

These questions should all be solved by their reduction to dollars and cents, nor is it a question of which motor or system is the most efficient considered individually but which equipment gives the greatest return on the investment, all expenses being taken into account. It will, in general, be found more economical to install a central power plant with some form of power transmission on account of the saving in attendance, in delivery of supplies, and in making the average load on the plant more uniform. For our present purpose we will assume that these questions and the question as to what form of machine will drive the generators, whether water turbines, gas engines, reciprocating steam engines or steam turbines, have been decided in favor of a central generating station with generators driven by reciprocating steam engines.

Curves showing the sum of the power requirements for different hours of the day and for different periods of the year should be plotted, from an inspection of which suitable commercial sizes can be selected for the generating units, care being taken to select sizes so those running will operate at nearly full load rating for different conditions of the load. As many of the units as possible should be the same size, to allow interchange of working units, to facilitate repairs and to prevent delays due to part of the plant being incapacitated. Assuming proper efficiency for the generators and engines combined 70% to 85%, and suitable performance for the driving engines from 13 to 30 pounds of steam per indicated horsepower hour these output curves should now be reduced to boiler horsepower, that is to 30 pounds of steam per hour. To these the steam required for auxiliaries and for other than generating purposes should be added. From inspection of these new curves suitable commercial sizes of boilers from 100 to 650 horsepower can be selected and additional ones added to allow the proper proportion, from 5% to 10% depending on the feed water, to be out of service for cleaning.

With the size and number of the generators, engines and boilers determined we can form an approximate idea of the space required for the power house and can proceed with its construction.

In the selection of a location for the plant the following points are among those which should be considered: The location should be as near as possible to the power center of the area to be supplied so that the loss in transmission is a minimum. It should be such that it will be possible to extend and increase the capacity of the plant. It should be convenient for the delivery of fuel and other supplies, and situated where suitable feed water and condensing water, unless a cooling tower is to be used, can be obtained. The power house should be detached from inflammable structures likely to cause damage by fire and from buildings where any vibration is objectionable. The power house itself should be of fire proof construction throughout and particular attention given to getting good foundations and as much natural light as possible.

It should be remembered that a power plant is not to be judged by its condition when just completed but by the continuity and efficiency with which it supplies the required power, and the arrangement of all the main features and details should be such that the failure of any single piece of apparatus will not cause a temporary shut down. Not only must the engines, boilers and generators receive consideration, but the connecting links, the auxiliary apparatus, the piping, wiring, etc., must be carefully planned if the plant is to give economical and uninterrupted service.

We will now pass to the consideration of the different pieces of apparatus usually found in local power plants though, of course, whether these are or are not installed in each case depends on the requirements and on whether a consideration of all the factors involved shows their installation to be a good investment.

Such a plant as we have assumed will consist of the following parts: Receiving of coal from point of supply, its storage and feeding to boilers; the removal and disposal of ashes; obtaining feed water, perhaps from river or well, heating it and putting it into the boilers, obtaining the necessary draft for burning the fuel; the generation of steam, its distribution to main engines and auxiliaries in a dry state; the disposal of exhaust steam by condensation or to free exhaust, operation of main engines and the generation of current; conducting current from generators to switchboard; manipulation and control of the current and its supply to service.

Boilers.

Boilers are usually designed to have from 10 to 12 square feet of heating surface per horsepower and there is greater difference in efficiency among boilers of one type owing to design and arrangement than between the different types properly proportioned, the water tube boiler being considered the safest and easiest steaming type.

The type of boilers whether water tube or fire tube and if the latter whether return tubular, locomotive or vertical, having been decided, attention must be given to the setting. The foundations should be of the best and the drums supported from steel framework independent of the brick setting. The furnace and generally most of the internal walls should be lined with fire brick. Pockets to allow for expansion of bridge and flame walls should be left in the side walls. Header courses should be frequent throughout the setting. Woven wire is sometimes used as a bond throughout the walls to prevent their cracking. Proper room should be left for drawing tubes and arrangements made for disposal of the blow-off. It is well to use two valves on each blow off, one to act as a guard in case the other is worn or clogs. Check valves are used in some cases on the steam pipe from each boiler so that should accident happen to one boiler the remaining boilers will not blow out through the damaged one. The artificial light should be arranged so that the water columns are readily seen. Proper support for the smoke flue should be provided. Where uniform steam pressure is desired, as where the load is mostly engines, a pressure regulator should be adapted to the main flue damper. Devices for maintaining uniform water level in the boiler may be installed for convenience, but should not be trusted to do away with constant attention from the fireman.

Coal and Ashes.

The method of handling the coal from cars or barges to the stoker hoppers, of arranging suitable storage, and of handling ashes from ash pit back to the cars or barges, should be planned ahead so that the necessary arrangements can be incorporated in the construction of the building. In the larger plants the coal handling machinery is separate from that handling ashes, the ashes in this case being dropped from ash pits into cars which are elevated and dumped into the ash

*Abstract of paper read at the May meeting of the Engineer's Society of Western Pennsylvania.

storage. In smaller plants, however, it is often desired to combine part of the machinery and use the coal elevator for hoisting ashes, delivering ashes to a storage bin over coal siding by an adjustable gate in the discharge chutes. Owing to the cutting action of the ashes on the machinery this should only be done when it is understood that the depreciation of the apparatus handling ashes will be very rapid. In arranging this machinery easy access should be provided to all moving parts and particularly to the engine or motor driving it. Some protective link such as a current fuse or a wooden key is desirable to prevent wreckage due to clogging by large lumps of coal. Wooden timbers should not be used in blocking up the gears on account of warping due to rapid drying in boiler room. The whole apparatus should be well cased in to prevent the flying of dirt.

Stokers.

Stokers can in general be shown to be a profitable investment even in this district of cheap coal when more than one fireman is necessary. When properly designed they should feed coal to the furnace at a desired uniform rate with minimum labor and be so arranged that the volatile gases given off the entering coal shall have perfect combustion before passing from the furnace.

Feed Water.

Emergency arrangements can generally be made for fuel supply but it is not usually easy to make quick emergency arrangements for an extra feed water supply and therefore great care should be given to the installation of feed water apparatus. As to the source of feed water, Nature has not been very generous to us in this district. The supply of sulphuric acid and sulphate of lime seems more than adequate, but good water is scarce. This is being overcome by treating the water either before it goes to the heater, in the heaters or in the boilers themselves. If the plant is large enough or if the expense is not prohibitive the first method is preferable. Almost all the waters of this district can be satisfactorily treated and either one of two results obtained. Either the resulting water contains a soft sludge which settles in the boilers and has to be washed out or else the water contains salts in solution, which owing to concentration in the boilers will cause foaming unless blowing out is performed regularly. In stationary boilers the latter evil is probably the lesser. If possible two independent sources of water supply should be provided for feed pump suction. No power plant is too small to have two independent methods of forcing the water into the boilers. In small plants a feed pump relayed by an injector which should be operated from time to time to see that it is in order, is satisfactory, while in larger plants two or more feed pumps should be installed. These pumps should be very strong, usually of the solid plunger, outside packed type with easily accessible water valves, of very liberal capacity and equipped with water relief valves. The feed water piping should be heavy and have extra heavy fittings forming, if possible, a loop so any section can be cut out without stopping supply to other boilers. If the impurities in the water are likely to act on iron the feed piping, particularly that part conveying hot water, should be of brass. This piping should be supported independently of the boiler settings to avoid trouble due to settling of walls.

Feed Water Heater.

Feed water is heated before it enters the boilers and the consequent economy of 1% of fuel for every 10 to 12 degrees heated gained by three methods. First by a heater sometimes called a primary heater installed between the engines and condensers, heat to the temperature of steam at the vacuum used being available. Second by a heater called a secondary heater, installed in the steam passage to free exhaust, the temperature here being 212 degrees. Third by a heater called an economizer, installed in the passage way of the gases leaving the boiler, and which usually run from 400 to 600 degrees, where the feed water can be heated to about 300 degrees F.

The first two heaters may be either of the steam coil or water coil type with copper, brass, or charcoal iron tubes, or coils. If the feed water is such that a deposit is at all likely in the heaters, these should be of the straight water tube type with removable heads to permit cleaning. Closed feed water heaters used in the free exhaust line are generally designed to have ½ of a square foot of heating surface per horsepower rating, but if particular results are wanted the heater should be more carefully designed with regard to material of tubes and velocity of water in them.

The second class of heaters or those in the free exhaust may also be of the open type where the exhaust steam comes in contact with the feed water, and in some cases these heaters are used as purifiers, part of the scale forming matter settling out owing to the water temperature being raised. As exhaust steam from reciprocating engines always contains more or less oil, the open heater should not be used, especially in connection with water tube boilers, without proper consideration of the troubles which may be caused by this oil getting into the boilers.

The third class of feed water heaters or economizers consist of vertical water tubes, joined by headers, mounted in the flue carrying the hot gases from the boilers and have scrapers which keep the outsides of the tubes free from the constant deposit of soot. It is always desirable to arrange a second passage way from boilers to stack so that the gases may be by-passed around the economizers to allow for repairs and proper allowance must be made in stack for reduced temperature of gases and increased friction of passage way.

Draft.

Draft may be obtained by three methods; chimneys, mechanically driven fans including draft or mechanically driven fans forcing a draft. The latter method is not much used, the selection being generally between the two former methods, and should be based on a consideration of first cost, operation, and repairs, allowing for the possibilities of increasing the capacity during emergency and the more perfect control of the induced draft method.

Owing to the cheapness of fuel in this district economizers and condensers are not usually found in the moderate sized plants, and owing to the nature of the fuel which by comparison does not require a very great amount of draft for proper combustion, the usual method of obtaining draft is by brick chimneys or by brick-lined steel stacks. The height of a stack should be based on the required amount of draft for proper combustion of the fuel, which varies with nature of the fuel used, allowance being made for loss of draft due to friction of gases in stack, flues, boilers and grates. In many cases, owing to local conditions as to adjacent hills or high structures, the stack has to be put higher than estimated by the above method. The height being determined, the stack must have sufficient area to carry away the total amount of gases at a velocity which will be caused by the draft obtained.

Pumps.

Pumps for general water supply may be either reciprocating, centrifugal or rotary. The reciprocating pumps may be either steam or power driven. Usually the nature of the service will determine the class of pump, the steam pump being best adapted where a constant water pressure is to be maintained, as a valve actuated by the water pressure may be put in the steam line to pump, and thus control the admission of steam. It should be remembered that the simple steam pump takes from 90 to 125 pounds of steam per horsepower hour and the compound steam pump takes from 60 to 80, as against about 20 pounds per horsepower hour in the generating engines, so that where the exhaust steam from the pumps cannot be used for heating and where fuel is dear, the power pump is generally more economical in consumption of power, though not so readily controlled.

Where the head and volume are constant the centrifugal pump, direct connected to a motor, makes a very suitable arrangement on account of its simplicity, cheap first cost and small floor space. Centrifugal pumps designed to fit conditions can be made to have an efficiency of about 60 percent, and while this is not equal to the efficiency of power pumps the centrifugal pump will in some cases on account of first cost, maintenance and room occupied, be found the cheapest arrangement.

The pumps should be located so that the suction lift will not, under the worst conditions, be more than 18 to 20 feet; suction lines for reciprocating pumps should have an air chamber near the pump and by locating this so the momentum of the water acts directly against the air cushion instead of

rushing past it, all water shocks may be avoided. Both suction and discharge pipes should be designed so the loss by friction is not too large. This, of course, depends on length of pipe, but for ordinary conditions a water velocity of 300 feet per minute gives good results. Easy arrangements for priming should be made and a water relief valve put in the discharge line to prevent excessive water pressures.

Condensers.

Condensers by causing a vacuum on the exhaust side of a piston of an engine allow the steam to expand through a greater range, that is, to reach a lower thermal limit and consequently save from 15 to 25 percent of the steam required to develop the same work. Depending then on the cost of fuel, the cost of condensers, their maintenance, the extra piping involved and the cost of power for the circulating water, the condenser is, or is not, a paying investment. Where exhaust steam can be used for heating purposes the gain by use of condensers is reduced, while on the other hand, if the feed water supply is very bad or costly, the water of condensation may, by being properly freed from oil, be re-used and a large saving in boiler repairs and cost of feed water be made.

Condensers are of three types: the surface, the jet, and the siphon or barometric jet. In the former, the condensing water does not mix with the water of condensation, the exhaust steam and condensation being drawn over a series of tubes by a pump discharging to waste or to a hot well while cooling water is being circulated through the tubes by another pump. In the jet condenser the cooling water and exhaust steam are mixed in a chamber and are drawn out by a pump. This method cannot be used when it is desired to use the heated product for feed supply unless the supply of cooling water is also good for feed purposes. The siphon condenser is similar to the jet except that it has a vertical discharge pipe over 34 feet in height, so that the condensation dropping down creates a vacuum in the head and no pump is needed.

Engine Room.

Even in the moderate sized plants the installation of a hand power crane pays for itself during erection, while in larger plants an electric crane, capable of lifting the heaviest piece of machinery, is usually installed. Sufficient room for good passage way between engines, after all piping is in place, should be allowed, and the apparatus set so there is room to dismantle the engine or generator for repairs. Galleries around and between the engines should be designed with the method of operation in view, and arranged to save as much labor as possible in engine attendance. Oiling arrangements should be planned, the different oils being piped to the points of use and kept under pressure by a pump or by compressed air, then drained by pipes to the filtering tanks.

If compressed air is available, this should be piped to points throughout the engine room so the more inaccessible parts of the machinery may be cleaned by its use.

Piping.

The piping is a very prominent factor in the satisfactory life of a power plant. Leaky joints, water in engine cylinders, water hammers and shocks can be avoided by properly designed piping. Some of the more common methods of piping are:

1. Cast iron bell and spigot pipe with leaded joints mostly used for water and gas lines which are buried in the ground and seldom found inside the power plant.

2. Wrought iron and steel pipe of different weights with cast iron screwed fittings of corresponding weights, generally used for all purposes in the smaller sizes.

3. Wrought iron pipe with cast iron flanges and cast iron flanged fittings of different strengths, used in the larger sizes and where it is probable the piping will have to be frequently disconnected.

4. Cast iron flanged pipe is used for exhaust steam and light pressure work, being in the larger sizes cheaper than wrought iron pipe.

5. Riveted sheet steel pipe is used for light pressure work such as exhaust steam and blowing air.

Steam Piping.

The pipe sizes should be such that they will carry the needed amount of steam without undue loss of pressure. Average velocities of the steam in the pipes for reciprocating engine leads, being from 2,000 to 4,000 feet per minute and higher velocities, can be used where rate of flow is uniform.

The steam piping is usually of wrought iron or steel pipe with flanges and flanged fittings bolted together with either rubber or metal gaskets between the flanges. The flanges are generally screwed on the pipe, but there are several other ways of attaching them, the best undoubtedly being that of welding steel flanges to the pipe. There are in general two classes of flanged fittings known as "Standard Weight" and "Extra Heavy Weight," the former used up to 100 or 125 pounds pressure and the latter from that up to 200 pounds.

The dimensions of these fittings, the number of bolts, the diameter of bolt circle and so on for the different sizes are likely to vary with the maker and always form a very troublesome detail in the piping work. Two standards known as "A. S. M. E." for standard weight fittings and the "Manufacturers" for extra heavy fittings, have been adopted by the Manufacturers' Association and are coming into general use. I would suggest that in buying apparatus, vexing details and delays may be avoided by specifying and insisting that all flanges are according to these standards.

The fact that iron expands with heat seems to be frequently forgotten when steam piping is being laid out and long runs of straight pipe are sometimes fastened by rigid fittings to fixed pieces of apparatus.

The expansion and contraction can be readily calculated and should be properly cared for by bends or offsets of sufficient length for the deflection required, otherwise unnecessary and often dangerous strains are caused in fittings and valves, ultimately causing leaks. Steam pipes should be supported in such a manner as to allow this expansion to take place and be anchored in a way which will cause the expansion to take place in the direction desired. All water pockets in main steam lines should be avoided, for which reason gate valves are to be preferred in steam mains rather than globe valves. The water of condensation and in suspension in steam lines must be removed and is done by the use of steam traps or a Holly steam loop which automatically returns the water to the boilers without the aid of moving apparatus. This cleaning of the steam lines is greatly aided by intelligent arrangement of pipes and fittings based on the appreciation of the fact that the steam and water are moving at the rate of three to five thousand feet a minute. From the location in which we sometimes see pipes, it might be thought these could be put anywhere. This idea is, however, likely to prove expensive before the pipe has outlived its usefulness. All steam pipes should be placed where every fitting can be inspected from time to time and where all the pipe can be covered.

The subject of pipe covering has recently received some attention, the general result of which has been the statement that even with cheap coal the installation of a high grade of covering is a good investment. The covering on steam pipes should of course be non-inflammable, and material that will not char with time. Among other substances carbonate of magnesia and asbestos are frequently used.

Wiring.

This, too, is a detail worthy of some thought. Current conductors are of three kinds:

1. The conductor covered with a series of braids saturated with a preservative compound known as "Weatherproof," which is used for overhead outside work.

2. The conductor insulated with rubber and protected with braid used for work inside buildings and in conduit in dry places.

3. The conductor insulated with rubber or paper and sheathed with lead, this for use in damp or wet places and in conduits in damp places. These conductors should be supported in such a manner that the insulation will not be damaged by the supporting device, and should be properly protected from chances of mechanical injury. As the large lead covered cables cannot be turned around a sharp corner, proper space for the wiring between generators and switchboard and from switchboard to service should be provided in advance.

Passing to the consideration of the completed plant, a moderate sized one in this district may be briefly described as follows: Building 100x70x30 feet high. Brick with steel col-

umns. Six 250 h. p. horizontal water tube boilers equipped with stokers actuated by two 6-h. p. steam engines. Steam pressure 150 pounds. Coal and ash bucket elevator with a capacity of 30 tons an hour, driven by a 10-h. p. motor. Coal conveyor of same capacity, driven by a 7½-h. p. motor. Coal storage of 300 tons above front of boilers, feeding by spouts to stoker hoppers. Brick stack 8 ft. diameter, 135 feet above the grates, fuel being "slack." Two 9x5x10 pressure pattern feed pumps with 4-inch feed line. One 1,000-h. p. feed water heater with straight brass water tubes. One 10-ton hand power crane in engine room. Five 250-h. p. compound non-condensing engines running at 280 r. p. m. direct connected to 150-k. w., 240-volt d. c. generators. Two compound steam compound air compressors, each with a capacity of 1,000 cubic feet of free air per minute to 100 pounds. Piping—Steam; wrought iron pipe with extra heavy flanged fittings, 8-inch delivery from boilers, 10-inch main header, 6-inch leads to engines, 4-inch leads to compressors. Exhaust 16-inch main of cast iron with 8-inch wrought iron branches from each engine and compressor. Steam piping drained by a Holly loop, this plant being run non-condensing, as part of the year exhaust steam is used for heating.

As to the larger central station practice we gather the following from Mr. Wells' paper before the Association of Edison Illuminating Companies comparing the five largest stations in New York. They have a capacity of from 15,000 to 40,000 rated boiler horsepower in units of from 265 to 650 h. p. The stacks vary from 200 to 350 feet in height above lower grates, in some cases fans being used to assist the stacks. The coal handling machinery has a capacity of from 125 to 180 tons per hour and the majority use motors for driving this machinery. They have a cold storage of ⅓ to ½ ton per rated boiler horsepower. All the boilers are of the horizontal water tube type and all but half the boilers in one plant have stokers. The working steam pressure varies from 150 to 175 pounds per square inch. In four plants the feed pumps are steam driven, having compound steam cylinders, the fifth plant having motor driven power pumps. Three of these plants have economizers, three having primary heaters, that is heaters in the steam line to condensers, and three have heaters in the free exhaust lines. The engines are all compound reciprocating steam engines of from 4,500 to 8,000 nominal horsepower with 60-inch stroke, running at 75 r. p. m. Three plants have jet condensers and the balance the surface type. The generators are all of the three phase alternate current type generating at from 6,600 to 11,000 volts.

In conclusion, your attention is again called to the fact that the power plant of today is a commercial proposition, an investment on which dividends are expected and that these dividends are not necessarily greatest when some pieces of the apparatus have reached their highest stage of mechanical or thermal efficiency. The end of a power plant is to supply its requirements and to supply them all the time.

Dividends on United States Steel Common.

A statement credited to a "prominent director" of the Steel Corporation, but believed to have come from the office of J. P. Morgan, with his knowledge and consent, was published in Wall Street last week in reference to the report that the quarterly dividend of 1 percent on the trust's common stock would be reduced or passed entirely. The statement follows:

"There is no probability of a reduction in the dividend on the common stock while earnings remain above $100,000,000 a year. It was on this basis that the common dividends were started, and buyers of comon stock could very justly complain should a different policy be pursued. The earnings this year will be $125,000,000. The prices of finished steel have not been reduced in any branch of the business, and if pig iron is lower it will only increase the profits of the steel company, since they are purchasers of pig and not sellers. To me the low price of steel stock is inexplainable."

The Maryland Steel Co. has received the official reward from the government to build the fifth dredge. The contract price is $175,500, and the boat is to be delivered in 13 months.

THE PREMIUM PLAN MISREPRESENTED.

At the Buffalo convention of the Railroad Master Blacksmiths' Association, Aug. 18-20, a paper on "Advantages of Piece Work Over Day Labor" (*The Iron Trade Review*, Aug. 27) was read by Mr. Thos. F. Keane. After giving some personal criticisms of the premium plan, Mr. Keane proceeds to make some supposed statements of fact as follows:

"Take a case, however, when this premium plan has been adopted for trial with the consent of both parties. What has happened? In but one instance brought to my notice has the premium plan succeeded. This is in Mr. Rowan's works. He has through this system increased his output at a reduced cost, and also increased the pay of the men. But as this is one special case, it is only fair to infer that it has probably been not only because of Mr. Rowan's marvelous ability as a manager, but to his individual personality as a man, and the feeling of good fellowship which existed, as he himself stated, between him and his men at the time the scheme was adopted. And it is doubtful if there are many men possessing all these faculties necessary for the adoption of such a scheme. In all other cases this plan has not attained its purpose. From the report of the Board of Trade in the United Kingdom, out of 178 firms who adopted this wage system, 94 totally discontinued it. While from the remainder all had either so modified it that it was no longer recognizable as a premium wage system, or were simply waiting until the end of the time agreed upon to discontinue it."

As this was news to us, we wrote Mr. Keane for the source of his information, and in reply he refers us to the *Engineering Magazine* of July, 1903, page 536. Looking up the reference, we find it to be a paragraph of an article on "The Promotion of Industrial Efficiency and Industrial Prosperity" by Mr. John B. C. Kershaw, the cited portion being as follows (italics ours): "From the Board of Trade report on profit-sharing in the United Kingdom it may be found that up to the end of 1899 over one hundred and seventy-eight firms had tried schemes of *profit sharing* with their employes, and that of this total, ninety-four had discontinued them, after longer or shorter periods of trial."

We charitably assume that Mr. Keane has confounded the premium plan with the profit-sharing plan, and hence misunderstood the figures which he quotes, although it is impossible to understand how such a mistake could have been made. The article quoted from, distinguishes clearly between the two plans, and is, in fact, an endorsement of the premium plan. Thus, on the page immediately preceding the one from which the above quotation is taken, we find the following: "As the battle of industrial competition will in the future be fought largely on the ground of rapid manufacture, it is probable that a modification of the bonus system, on the lines of the American premium system of payment, will be generally adopted on the eastern side of the Atlantic. . . . My belief that a modified form of the American premium system will displace other profit-sharing systems of payment, is based on the fact that most men (whether workers or capitalists) prefer a pound in the pocket to a post-dated cheque on a shaky bank, and would rather receive a premium of 50 percent on their income paid *weekly*, than a bonus of 5 percent or less paid *annually*. That this is not an unfair statement of the relative rewards offered by the two systems, is proved by comparing the statement as to the average amount of the premium received by the workers in the Westinghouse company's works at Pittsburg, ranking from 25 to 100 percent on the weekly wages, with the Board of Trade report upon the results of the profit-sharing system in operation in fifty-eight English works, employing 20,000 workers, in the year 1901. In thirteen instances no bonus at all was earned, in twenty-three cases the bonus was under 5 percent, and in only five of the works did the bonus exceed 11 percent. The mean bonus for the whole of the works was five percent."

While the last quotation, by the use of the word "other," classes the premium plan as a profit-sharing system, nevertheless it is perfectly clear that the failures in Great Britain have not been of the premium plan, but of the general scheme of the division of profits at the end of each year. Mr. Keane is, of course, entitled to any personal opinions he may have regarding the merits of the premium plan, but he has certainly misquoted Mr. Kershaw's words and made statements which are the direct opposite of the truth.—[American Machinist.

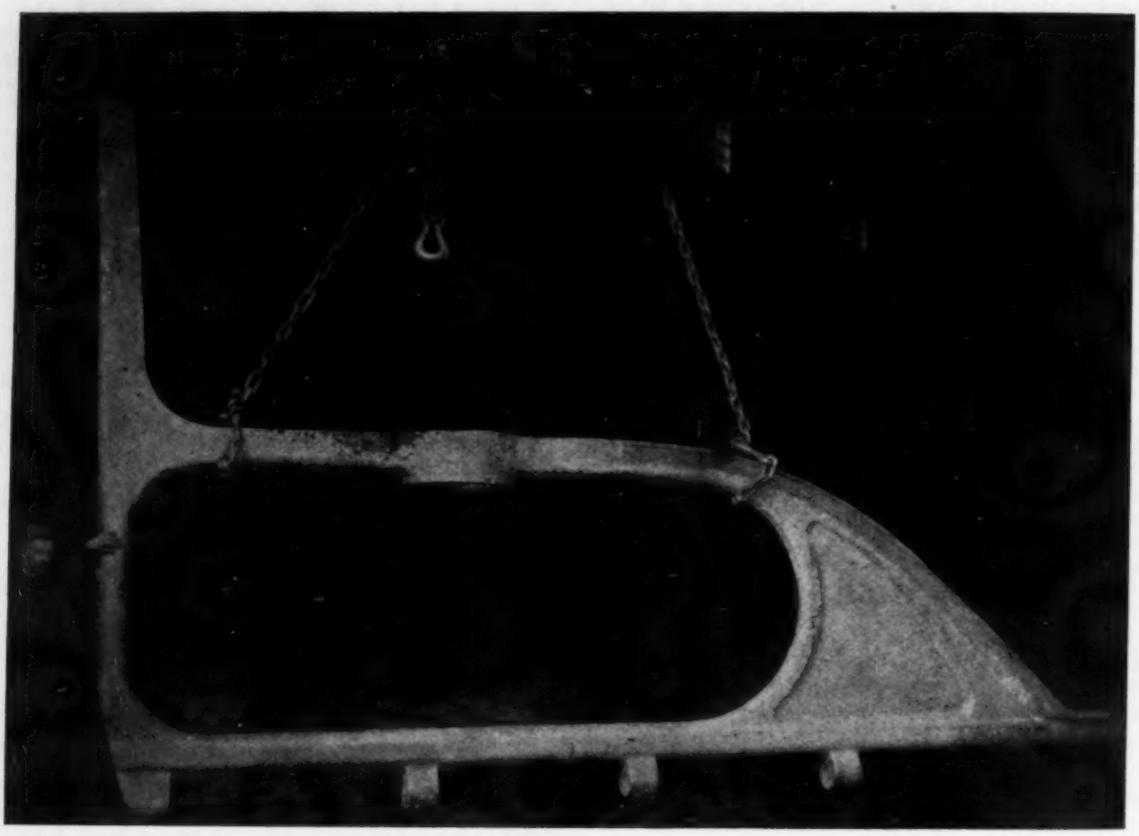
SOMETHING OF A STEEL CASTING.

A rudder frame of considerable size has been cast by the Pittsburg Steel Foundry, of Pittsburg. The steel casting is illustrated. It is 23 feet long by 13 feet 4 inches wide, and weighs 11,624 pounds. This rudder frame was made for the Manitowoc Dry Dock Co.

HIGH SPEED STEEL.*

BY H. W. RUSHMER, COLUMBUS, O.

It is not my intention to present tables showing the high speeds, heavy feeds, or the amount of metal removed from certain pieces in a given time with this high duty steel, but rather to state a few facts that have been gleaned from daily practice which may be helpful to some in gaining a higher degree of efficiency from their tools. These high records are usually tests made under favorable conditions and are rarely maintained any length of time in daily practice. It is sufficient to say that the gains are so large in using this steel that it would show poor business tact if we did not take full advantage of it regardless of its present high price.



A STEEL CASTING OF LARGE DIMENSIONS.

In 1901 patents were granted Messrs. Taylor and White for a brand of steels alloyed with tungsten, molybdenum and chromium in certain given proportions, also a special heat treatment for the same. The edge holding power of tools made from this steel and given the special heat treatment exceeded all previous attainments to such an extent that it required the reconstruction of certain machine tools to use the steel up to its limit.

Mr. Taylor was superintendent of the Bethlehem Steel Co., and he was testing the relative merits of the standard brands of self-hardening steel when one brand failed to give results as represented. The agent for the steel being apprised of the failure, determined to investigate the cause, and readily discovered that the heat treatments were much lower than he had recommended them to use.

By complying with the instructions the tools were forged and quenched at a much higher range of heats, which resulted in a marked increase in the efficiency of the tools. Encouraged by these results he tried other brands by heating them to this same range, but finally carried the heats to that point where the steel softens or crumbles (between 1,900 degrees and 2,000 degrees F.) if touched with a rod. As all the self-hardening brands very considerably in composition, so did his final results, but the increased efficiency of some brands was surprising. He concluded to push his investigations a little further and see if a steel could be made that would give better results than the self-hardening when given the high heat treatment. By enlisting the assistance of Mr. White, a chemist, they eventually produced the remarkable steel that bears their names.

It is with interest that we note the rapid trend of events; it is a trifle over 2 years since this remarkable steel was patented, and today it is scarcely heard of. Spurred on by the successes of this new rival, the leading steelmakers were soon upon its heels with a superior steel, willing to sell to all, requiring no expensive shop right to use it or the signing of a binding contract, consequently it was forced to retire before it was generally introduced.

It is well known that if tools for planers, slotters, etc., were made from the self-hardening steels of the past (Taylor-White included), there was a decided tendency of the cutting edge to crumble, especially when cutting hard, tough materials, thereby leaving a rough finish. The construction of the above mentioned machine is such that during the time they are retrieving, the cutting edges of the tools are required to drag back over the surface just cut, then the machine being reversed, the tools suddenly enter the work at full speed and full depth cut.

Therefore it must be obvious that tools working under these conditions, and required to maintain a good cutting edge, they must be of the highest quality, and not the least friable. It is under these trying conditions that this new steel has easily demonstrated superiority over those of the past. Another advance is the manufacture of twist drills from this material; the results are very encouraging for a better drill in the near future. It is true they are not equal to the carbon steel drills in strength; there is a tendency to split through the center, but if the workman exercises his good judgment, there will be very little trouble from this direction. Taps, milling cutters,

*Read at the Buffalo convention (August, 1903) of the National Railroad Master Blacksmiths' Association.

reamers, etc., are being made and used with some success, but, like all things in their incipiency, there are some failures. There are good reasons for believing that in strengthening the teeth, improving the methods of hardening and regulating speeds and feeds to suit the new conditions, they will be a decided success. It will be observed that the cutting edge of tools made from this steel (or in fact any of the alloyed steels) soon becomes slightly rounded, and in this condition they appear to render their best service. This peculiarity makes it unsuitable for finishing tools where keen and enduring edges are required; for instance, a tool for chasing a standard tap must cut perfectly smooth and accurate the full length of the tap; if not, the tap would be worthless. This is one of the reasons why the alloyed steels are a failure for edge tools.

The process of annealing can be easily accomplished by any of the methods employed with the self-hardening brands. A sure and safe method is to pack the steel in an iron box or a piece of pipe and surrounding the steel with powdered charcoal, then well-sealing the openings with fire clay. The box or pipe is placed in the furnace, heated to a bright cherry red color for several hours, then permitted to cool down slowly; the slower the process of cooling the softer will be the steel. If properly annealed it will machine as easily as tool steel. It has superior forging properties when compared with the self-hardening steels of the past, which allows it to be forged into the difficult shapes. Furthermore, this has been quite an advantage to the steelmakers in producing a steel almost free from seams. In order to forge it successfully it should be heated to a good lemon color heat taking care to heat it slowly and thoroughly in a well burnt coke or coal fire. If heated properly it will be in a perfect plastic condition and the steel will flow readily under the hammer. Remember it cools down much quicker than carbon steel, and when slightly cooled it becomes hard and unyielding; far more can be accomplished in a given time by frequent heating and only working it in a perfect plastic condition; furthermore, if this is observed, strains and ruptures will be avoided. It is absolutely necessary that the base of all tools should be perfectly straight, and the attention should be directed to this important part before the tools are finished. By heeding this caution it will save the loss of many valuable tools, besides the tools can be held more firmly and rigidly in the tool post. After forging the tool it is advisable to lay it down and allow it to grow cold, then reheating for hardening.

Probably the most interesting and important part in manipulating this new steel is the process of tempering it. To temper the steel properly it must be heated to a fusing or welding heat; the conditions required are about the same as for welding tool steel. The methods used in applying the heat are very important, regardless of the advice to the contrary. To obtain satisfactory results, it is best to build a covered fire with a liberal amount of crushed coke over the tuyere, thus avoiding an oxidizing fire. The blast must be used rather sparingly, for if time is not allowed for the steel to conduct the heat properly the point of the tool may burn off or the coke over the tuyere will burn down to such an extent that it will allow the blast to impinge too strongly against the steel, and thereby prevent the proper conditions from taking place. If the steel is heated too quickly and to the highest possible temperature, the fractured piece will show a dry, brittle, lifeless structure, proving that deterioration has taken place, consequently there will be a corresponding loss in edge-holding power. When the steel is carefully heated in a fire as above mentioned, and a white heat has been attained, a faint fluxing will be noted; as the temperature increases innumerable minute bubbles will be observed; by prolonging the treatment the bubbles become larger and less numerous; when carried to the extreme the steel will finally soften and melt. This part of the process, for the want of a better term, has been called "sweating," which it somewhat resembles.

The "sweating" properties are more pronounced in some brands than in others, besides some steelmakers recommend a longer sweating than others, but if the smith is guided by his trained judgment and observation, he will soon learn to regulate the sweating to meet the requirements. Although not generally known, these sweating properties are inherent in all steel, and some of the old self-hardening brands can be improved considerably by this treatment, providing the sweating is not carried to the extreme. The toolsmith, to be successful in his business, must have a well trained eye; he is required to work in all degrees of light and at times it is with difficulty that he locates the proper hardening heat. The locating of these high sweating heats will place a greater strain upon his eyes, and will make his position more difficult and important than ever.

After sweating, the tools are quenched in oil, the compressed air, or a strong blast. There are other methods, but they are not used to any extent. In some cases it is advisable to draw the temper, and this can be accomplished by cooling the point and drawing in the usual way, or they can be cooled in their entirety and then drawing the points by conducting the heat from the other end of the tools, and then permitting them to cool down slowly. In order to harden taps, mills, reamers, etc., successfully, they must be heated in a lead bath, and a graphite crucible is absolutely necessary, for the lead must be heated to a white heat or to the highest possible limit. The lead should be covered with powdered charcoal, to prevent it from wasting or oxidizing.

My experience with this new branch of the art is somewhat limited, but I readily discovered that when a smith's forge is used, caution must be exercised in heating even the best graphite crucibles to this high temperature. If the blast is too strong the crucible will melt away in spots before the lead is hot enough to meet the requirements. The tools should be previously heated in a furnace to a bright red heat, then placed in the white hot lead. After the proper heat is obtained, the tools are submerged in the oil, and when cold they are polished and drawn the same as carbon steel tools.

Some of these steels refine equally as well as carbon steel, if the sweating is not carried to the extreme, and it is necessary that tools like milling cutters, reamers, etc., be hardened from this refining heat. We have been led to believe that the steel cannot be injured by overheating, but when we see a number of tools made from the same bar of steel, and some of them giving extraordinary results and the others a complete failure, it is quite evident that the heat treatment is a point that needs the closest attention.

There are special furnaces upon the market for sweating this steel, and it is claimed they are giving good satisfaction. It will be noticed that in griading any of the alloyed tool steels, the emery wheels become glazed very quickly. It is believed that the alloy tungsten is responsible for this sudden glazing; the little grains of emery of which the wheels are composed become dull and then coated with the tungsten; hence, the glazing. The tools are often ground upon these glazed wheels, and this inattention has caused the loss of many valuable tools, and I dare say that one-half of the tools ground on these wheels are injured to a greater or less extent. As a rule the workman takes no account of this glazing and bears with greater pressure as the wheel fails to cut, thereby causing an intense friction; this creates unequal expansion and contraction, resulting in numerous surface checks.

This can be avoided by replacjng the wheels with others that are softer and coarser, then dressing them as soon as they show the least indication of glazing, and the workman limiting the pressure according to the cutting power of the wheels. The sparks emanating from the majority of these high speed steels when ground upon the emery wheel are of a bright orange color. The sparks emanating from the old self-hardening when ground are dark red in color. The sparks being much lighter from the high speed steel is due to the presence of molybdenum and chromium. In one or two brands I noted the sparks were very light, and resembled the sparks emanating from machinery steel.

The contract for the construction of the Lake Erie & Pittsburg railway from Lorain to Youngstown was on Sept. 18 awarded in Pittsburg to William Kenefick & Co., of that city. Contractors will go over the line next week and work will be started this fall if weather permits. This road is being built by Pittsburg, New York and Chicago capitalists and will be operated as an independent line, and will afford an entrance into Lorain for the Lake Shore, Big Four, Pennsylvania, Wabash, Erie, Lake Erie, Alliance & Northern and the Pittsburg & Lake Erie railway, and will also be used to interchange traffic between these various roads.

THE HANNA QUICK-ACTING VISE.

The hold that the slow but sure solid nut vise has on the purchasing end of many manufacturing plants is due to a variety of causes, and careful consideration of these led up to the invention of the device here illustrated. A vise is apparently a very simple tool, but an examination of the requirements will be convincing that the device must be well made. The inventor of the Hanna quick-acting vise points out that the right kind of vise will be strong and convenient and will stay in that condition, the tool will have a quick action throughout the entire range of movement as well as a moderate degree of movement (say from 1½ up to 3 inches) under the maximum strain. He has evidently in mind the service of the vise for forcing bushings in or out of holes, forming hydraulic packing leathers and similar work where a long movement under strain is a convenient feature in a vise which is equally useful in other respects. The vise, as shown in Figs. 1 and 2, is similar in general appearance to other vises, the handle presenting the main feature of novelty at first glance. The operating lever is directly connected to the solid nut, as illustrated in Fig. 3, and the latter has a length of two and a half times the diameter of the screw and is capable of a movement endwise of from 1½ inches to 3 inches, according to the size of the vise. The screw is above the guide bar, and the bar and hole in the fixed jaw are of circular section, so that the surfaces are easily machined and brought to an accurate finish, quite uncommon in this class of equipment.

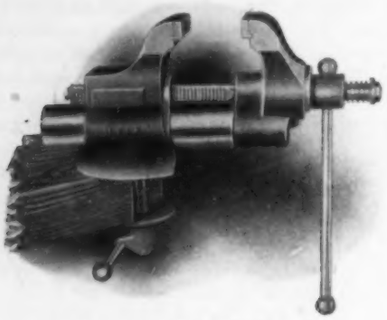


FIG. 1.—A QUICK ACTING VISE.

The movable jaw of the vise has a recess on the front for a bearing ring, which receives the thrust of the nut. The latter is threaded to fit the adjusting screw, and so far as the nut and the screw are connected the ordinary vise action is reversed—the nut rotating on the screw instead of the screw turning through the nut. A coiled spring tends to rotate the screw clockwise, and this action engages the ratchet teeth with a pawl, the latter having some ten teeth in contact at the one time, and in this position, Fig. 1, the turning of the nut on the screw brings the jaws nearer and tightens up the vise. When the handle is turned to the left or counterclockwise, a projecting lug on the nut comes in contact with the collar on the operating screw and turns the shaft. The teeth on the screw then leave the pawl and are in the position shown in Fig. 2, and the vise jaw may be quickly moved inward or outward to fit the work. The hand lever and nut are then turned to the right or clockwise, and the tension of the spring returns the shaft to engagement with the spring pressed pawl, and is held from further rotation by a toothed collar. A continued movement of the lever and nut to the right causes a forward movement of the jaw to grip the work.

FIG. 3.—VISE NUT AND OPERATING LEVER.

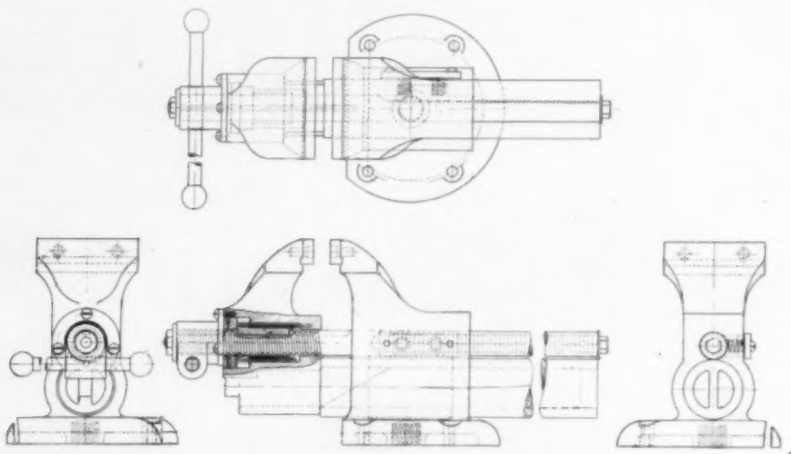


FIG. 4.—DETAIL VIEWS OF QUICK-ACTING VISE.

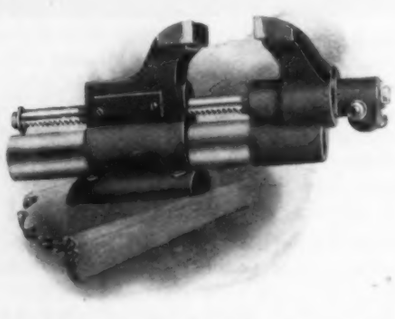


FIG. 2.—ANOTHER VIEW OF QUICK ACTING VISE.

This vise is made in various styles and sizes by E. E. Hanna of Chicago.

The Western Electric Co., which is the largest employer of labor in Chicago, has posted up notices stating that playing of the races and all other forms of gambling, immoral conduct and excessive use of cigarettes is prohibited, and any employe violating the above rules will be dismissed. Of the 1,500 employes of the Western Electric, 300 are college graduates, and these, the company's officials state, are all that could be desired, giving the fullest satisfaction in their work, and that not one of them has ever given them any ground for complaint.

On account of the present financial troubles of the Consolidated Lake Superior Co., there has been a large reduction of the working force both in offices and plants at Sault Ste. Marie, Canada. All the steel workers at the company's rail mill will be idle for the remainder of the winter.

The Detroit Trust Co. has been appointed receiver of the Columbia Iron Works, Port Huron, Mich., temporarily, pending a hearing of the petition to declare the company bankrupt.

American Iron Trade Conditions Unique.

In an editorial apropos of Andrew Carnegie's presidential address at the recent Barrow-in-Furness meeting of the Iron and Steel Institute, the London *Iron and Coal Trades Review* comments as follows on an old and yet ever new subject—the comparisons and contrasts of the iron trade situation in the United States and in European countries:

Under the constitution of the Iron and Steel Institute, questions of a purely commercial character are excluded from consideration. Hence, the presidents, in their several addresses, have mainly discussed technical aspects of the great industry which the Institute represents. Those addresses have covered almost every phase of the iron industry, as such. There is probably not much that is new to be said as to the general features of British iron and steel-making. The Institute has held the position which is common to all pioneers, of seeing the rest of the world begin almost where they had left off, and, to a considerable extent, get ahead of the original. It will take some time to recover what ground has thus been lost. But it is not at all improbable that British manufacturers, like those of the United States and Germany in the near past, will shortly start from a still higher plane, and will, in the long run, be able, in turn, to claim technical and general industrial superiority.

At no previous period, has the contest for manufacturing supremacy been fiercer, grimmer, or more determined, than it is at the present time. This is more especially true of the competition in iron and steel, which, next to food and clothing, rank among the first necessaries of life, and are, perhaps, absolutely the first, measured by their influence on the progress of civilization. Great Britain had long enjoyed the prestige and wealth attached to the distinction of having the greatest *per capita* production of iron. She no longer enjoys that position, having now been eclipsed by the United States, which moreover eclipses every other nation in *per capita* consumption of iron and steel. But the primacy and supremacy which the United States has now secured is being striven for with might and main by most of the other leading nations, all of which, except Great Britain, have made and are now making arrangements as far as possible to secure their home markets for home producers, whatever may become of those outside.

It is just six years since the Duke of Devonshire, in presiding over the Barrow Hematite Steel Company, remarked that "in American competition the cutting down of prices appeared to be something astonishing," and he proceeded to express the pious hope that American manufacturers might confine a good deal of their fighting to their own country. His Grace must have noticed that in the interval his wish has been complied with. It has been a battle of the giants. Throughout the whole of the manufacturing sections of the United States, these sons of Anak have ever since been engaged in what has, perhaps, been the greatest industrial contest of a strictly internecine character that the world has ever seen. No one can state exactly the total expenditure incurred in the United States in the expansion of the iron and allied trades during that period, but it certainly has largely exceeded the outlay incurred for the same purpose in any previous period of equal duration. The people of Europe have looked on with wonder and, perhaps, with ill-concealed admiration, while the American tinplate industry, within ten years, built 71 different plants, at a capital cost computed in the census returns of 1900 at 28¼ million dollars, giving employment to 15,000 hands, and paying over $10,000,000 annually in wages. This was, no doubt, a considerable stride, but it is not too much to say that it has been entirely eclipsed, relatively to the period covered, by what has since taken place.

When the statement was brought to this country that the Duquesne blast furnaces, built in 1897, were each capable of producing over 200,000 tons of pig iron a year, it no doubt supplied much food for thought to those who had, in England and Germany, been going on in the old rut of blast furnace operations, by which we mean an average output of 20,000 to 30,000 tons a year. It seemed to the European ironmasters impossible that any single blast furnace could be made to produce over eight times what was then the average annual output of British furnaces. At the date in question, it was gravely announced in the *Times* that "if British furnaces were equipped to do as much as these furnaces at Duquesne, about 40 furnaces would do the work that we employed 362 furnaces to do in 1896." Of course, this was an absurd conclusion, because what had been achieved in the one case was probably impossible in the other. The United States rejoiced in the possession of vast supplies of rich and easily fusible ores. Europe, on the contrary, had ores that were neither very rich nor very readily fusible. Moreover, it was naturally a matter of doubt whether it was worth while to attempt in Europe to rival American conditions, because while we had a home market that was increasing its wants by leaps and bounds, the American home markets were less responsive to any efforts made to increase their demands.

One of the most utter and obvious fallacies to which the average man is prone in making comparisons of the conditions of progress in the United States and in European countries, is that of assuming that they should proceed more or less *pari passu*, and that any increase of consumption and output on the part of the United States is inevitably attended by a decreased or decreasing consumption and output on the part of other nations. The conditions of such a comparison, and the logical deductions therefrom, so far from being akin, are as dissimilar as it is possible to imagine. The United States, with a land area of 3,000,000 square miles, can only be contrasted—not compared—with the United Kingdom, with its area of 120,000 square miles, from which, however, that of Ireland, being so unprogressive, may largely be deducted for exact comparison. The United States is much more than one country in the European sense of that word. It is a group of about 50 States and Territories, each one of which, for the purposes of trade, may almost be regarded as a separate country. In Europe, 18 different countries—the United Kingdom included—have an area of only 1,582,000 square miles, so that the United States land area is nearly double that of the whole of Europe, excluding Russia. Of course, if population be considered, the case is very different. The present population of the United States is probably about 82,000,000, which is fully equal to that of the United Kingdom and France together, and 30,000,000 more than that of Germany. The rate of American progress is, moreover, ahead of that of any European country. During the last three decades its increase of population per decade has averaged over 13,000,000, whereas Germany, the most progressive country in Europe, has only averaged about 7,000,000 per decade, and the United Kingdom has not averaged much more than 3,000,000. And after all, until now, at any rate, the annual output of iron in the United States has not exceeded that of Great Britain and Germany combined, although, no doubt, the American home consumption has always been a relatively larger figure. We have said enough to show that the increase of American iron-making resources, so far as it has already proceeded, is not necessarily a menace to this or to any other country, and that the notable achievements of the United States in this industry have been conceived and carried out with a special eye to meeting home demands on the largest and cheapest attainable scale. If Great Britain has neither the population, nor the area, nor the wants of her great rival, she cannot reasonably expect to make progress on the same lines.

It seems almost a dream to reflect that so recently as 1870, the whole steel output of the United States did not exceed 69,000 tons, whereas in 1902 it was not short of 13,000,000 tons, or about 200 times as much. Indeed, America has only achieved a respectable place in the open-hearth industry during the last few years. The American open-hearth steel output in 1902 was about 4,000,000 tons, but in 1885 it did not exceed 134,000 tons, so that in the intervening 17 years it has increased thirty-fold. The question has lately been debated whether the Bessemer or the open-hearth, or some new modification of either, will be the process of the future. Authorities in this country have expressed the opinion that the ultimate victory will lie with Bessemer's process. This conclusion may be right in the long run, but is not justified by the facts that are available up to the present time. In Germany, some two-thirds of all the steel produced are due to the Bessemer process. In the United States, the output of Bessemer steel is nearly three times that produced on the open-hearth. France and Belgium also produce more Bessemer than open-hearth steel, and the largest works built within recent years in Russia have been on the Bessemer system. At the same time, manufacturers, or

intending manufacturers, would do well to look carefully into the relative merits of the two processes, in relation to raw materials, requirements, and markets, before deciding which of the two is most suited to their conditions.

THE GERMAN STEEL TRUST NEGOTIATIONS.

The negotiations for the establishment of a syndicate of German steel works have made considerable progress recently. It is stated, apparently on good authority, that 29 of the principal works in Rhenish-Westphalia, the Saar district, Central Germany, and Upper Silesia have already signified their assent to the draft of the rules for controlling the industry, both as regards the home and export trade of the country. It is intended to include in the new trust the present members of the existing syndicates in semi-finished steel, gorders, rails, and plates and sheets, and to give to the combination the form of a limited company, as in the case of the Westphalian coal syndicate, in order to constitute it on a more solid foundation than would otherwise be possible. Among the works which are said to have already approved the proposed regulations of the syndicate are Friedr. Krupp (of Essen), the Dortmund Union, the Bochum Union, the Gutehoffnungshütte, the firm of Thysser, the Bochum Steel Works, the Duisburg Iron and Steel Works, and the Haspe Iron and Steel Works. To these undertakings, which are all located in Rhenish-Westphalia, must be added the enormous works owned by the firm of De Wendel at Hayange, and of Baron Stumm at Neunkirchen, in the Saar region, the Peine Rolling-mills near Hanover, and the Laurahütte and Friedenshütte in Upper Silesia. Nearly all these works, with the exception of the two last named, have within the last few years been visited by members of the Iron and Steel Institute, who have thus had an opportunity of convincing themselves of the importance and modernity of these mills.

It is a comparatively simple task, however, to prevail upon the principals of a number of influential works to agree to rules which as yet have no binding force, especially as the directors of all the works in question are thoroughly familiar with the practical working of trade syndicates. All of them already belong to one or more such organizations, in fact, the existing syndicates to some extent form the basis of the contemplated steel trust. But it is a much more difficult matter to arrange the maximum production which shall be allotted to each individual works, and the success or failure of the present scheme depends entirely upon the satisfactory settlement of this particular point. It must be borne in mind that during the past three years many of the works have greatly extended various departments, and are therefore now able to produce a larger tonnage than before. Naturally, such works claim to be awarded a greater percentage of the proposed total output than that to which they are entitled under the regulations of the existing syndicates of which they are members, these regulations being in many cases based upon the capacity of the works before recent extensions. On the other hand, the works where extensions have not as yet been carried out may be indisposed to agree to be tied down for a period of years on the basis of their present output, and it will be extremely difficult to reconcile these opposing interests to the scheme as it stands.

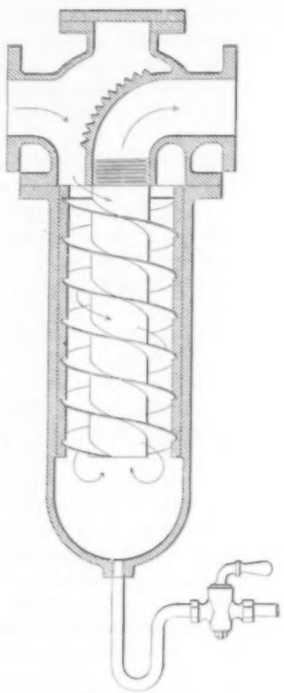
It would appear that the best chance of carrying the negotiations to a successful issue is to prune down the present scheme somewhat severely. This seems the more evident from the fact that it has been possible to bring about during the past few days a very important understanding between the semi-finished steel syndicate and the girder syndicate for the control of the export trade. This arrangement takes the shape of a compact not to sell for export at prices below a certain minimum, and it is thought that this agreement will stop the heavy underselling which has taken place for some time, and will increase export prices by from three to four shillings per ton. This result is highly probable, but it is doubtful, nevertheless, whether there will be apy diminution in the competition of German firms in British markets as a result of the new arrangement. If anything, the rivalry should become keener, because in future German quotations will, it is to be assumed, closely approach the British prices. Whether British producers of steel billets, blooms and girders will derive any advantage from the increase in German prices remains to be seen, but our rolling-mill owners who have so freely purchased billets and blooms during the past eighteen months will, it seems, have to make up their minds to pay higher prices in the future, and we may, therefore, expect an advance in the price of sheets.

A price convention for the export trade having thus been established by two of the leading syndicates, it is easy to understand that the gradual adhesion of the rail syndicate, the plate combination, the sheet syndicate, etc., to this new arrangement would actually create an embryo steel trust, from which, rather than from a cut-and-dried scheme such as referred to above, the great syndicate may grow up to its final shape. At the present moment, however, it would still be premature to prophesy such a result. All that can be said for certain is, that the mere rolling-mills—that is, those which depend upon the syndicates for their supplies of raw materials and semi-finished goods—will be gradually wiped out of independent existence either by absorption or extinction, because the economic position of finished iron and steel producers who do not own deposits of ironstone and coal and who do not produce coke, pig iron, and semi-finished steel goods is rapidly becoming untenable.—[London Ironmonger.

OIL SEPARATOR FOR EXHAUST PIPES.

BY ROBERT GRIMSHAW.

It may be interesting to recall the advantages of employing a separator on the exhaust line. They are, briefly, that where



A GERMAN OIL SEPARATOR.

the exhaust is used for heating purposes there is avoidance of deposit from the grease; where the condensed water therefrom is turned into the boiler there is better steaming, diminished fuel consumption and increased life of the boiler; where there is a condenser there is increased duty; the cylinder oil recovered may be used again in the same cylinder or elsewhere; there is less necessity for filtering the condensed water if used for boiler feed.

The illustration shows in part section a form of separator for removing oil from exhaust steam, introduced by a firm in Düsseldorf, Germany. The construction is self-evident. There are no movable parts to get out of order.

A change has been made in the publication of *Power and Transmission*, of Mishawaka, Ind., and in the future this magazine will appear on the first day of each month. The title page of the first number of the nineteenth volume continues to use the word "quarterly" as under the old conditions, but this will doubtless soon be changed to conform to the new order of things.

TESTS WITH HIGH-SPEED TOOL STEELS.

Some tests of cutting speeds with high-speed tool steels have been carried out by Mr. H. H. Vaughan at the Collinwood shops of the Lake Shore & Michigan Southern Railway. The intention at first was to make a comparative test between various makes of steel, determine which of them gave the best results in service, and ascertain what could be expected in regular work. Mr. Vaughan soon decided, however, that the first thing to do was to take one brand that showed good results and make sufficient experiments with that to determine what could be expected, and then endeavor to carry out the results in the shop, leaving the comparison between one steel and another until later. It is not so important to obtain the small percentage of increase of output that one good steel can give over another, as it is to obtain the greatly increased output that several of the new high-speed steels can give over the old water-hardening steels. The tests were all made with 1-10-inch feeds. The feed is one of the factors affecting the cutting speed in any tool and material, the cut being the other; to state at what speed a cut can be taken, it is necessary to also specify the feed and depth of cut. In the majority of locomotive work the cuts do not appear to vary sufficiently to affect the question very much, but the amount of feed is a different matter and is very important. By adopting a constant feed for all roughing work as far as possible this variable, which is the most difficult to deal with, is eliminated. This system is being introduced at the Collinwood shops with very satisfactory results, as the cutting problem at once becomes very simple and can be watched by practically noting the speed at which the work is running.

The machine used during all the experiments was a 28-inch engine lathe, direct driven by a motor of 7½ h. p., which could be temporarily overloaded to about 12 h. p. All tools were ground in a universal grinder, permitting them to be ground accurately to any desired angles. The series of experiments were made upon three classes of material—axe steel, wrought iron, and cast iron—to determine the proper cutting speed, feed, and depth of cut to be used, as well as the best methods of treating the steel, and the correct angles for grinding. A lateral feed of 1-10 inch was at once adopted as being satisfactory for most classes of work. A coarser feed would be very severe upon the point of the tool, and many cases may arise requiring a finer feed, depending upon the character of the work. The question of the most efficient depth of cut is one which cannot be definitely answered from the data at hand, because the power of the driving motor did not permit a cut to be taken which was at all near the capacity of the tool. By varying the cut through the range possible the indications were that the life of the tool at a constant feed and cutting speed was independent of the depth of cut. This is reasonable, for although the work of removing the metal increases directly as the depth of cut, after the point of the tool is buried the cutting edge provided to do this work is increased a like amount. The remaining points must be taken up separately.

Medium Steel.—On axle steel the preliminary tests of Styrian tool steel, run dry with the tool ground with 5 degrees end rake and 25 degrees side rake, showed a well-defined limit of cutting speed at about 45 feet per minute, beyond which it was impossible to go without very quickly running the tool. At 48 feet per minute the tool lasted 12½ minutes with a 1-10-inch by 3-16-inch cut, being very hot all of the time, the chips coming off a deep blue. It seemed reasonable to suppose from the endurance of the tool while hot that if the heat generated by cutting could be absorbed and carried away before it had time to heat the tool, the life of the tool would be greatly prolonged, and the cutting speed might be increased.

A water jet applied above the work would not accomplish this result on account of the water not coming into contact with the tool at the cutting edge. So a ⅛-inch copper tube connected to an elevated cask was carried along the tool rest on the leading side, the end directed upward toward the point of the tool at an angle of 45 degrees, and through this was forced a mixture of lard oil, resinous soap and water, at various heads up to 12 feet. The above-mentioned location of the jet was found to have the greatest cooling effect upon the tool, and splashed the least water; the results obtained from this arrangement of the water jet leave no doubt as to the advantages to be derived from its use on steel work. Other conditions being the same, a tool which burnt in 15 minutes running dry will run with the water jet for an hour or more in good condition. It is necessary to use just enough water to carry away the heat.

It is a rather remarkable fact, however, that the maximum safe cutting speed with a water jet is practically the same as without. The explanation is probably this: When tools have been removed from the lathe after cutting with the water jet, they have all been found more or less blue from a narrow strip along the cutting edge, showing that the water had not reached the extreme edge of the tool, even when applied under considerable pressure. At speeds up to 45 feet per minute the body of the tool conducts the heat away from the edge rapidly enough to prevent overheating, but at higher speeds this action is not fast enough, and the local temperature rises to a point which weakens the steel, so that the side clearance is worn away, spoiling the tool.

A very thorough investigation was made of the proper angles at which to grind the tools. The results indicated that a tool with small side rake would last somewhat longer than one ground at a greater angle, on account of the stronger backing of the cutting edge, the difference being greater when running dry than with a water jet. But the action of the tools in removing metal is that of a continual shearing in a plane nearly perpendicular to the top face of the tool. For a given feed the area over which this shearing takes place is much greater for a flat-topped tool than for one with considerable side rake; hence, the power required to drive a flat tool is correspondingly greater. This statement is verified by the fact that the chips from a flat-topped tool are blue and wear deep into the top of the tool, even with a water jet in use, while those from a thin-edged tool are not discolored and the tool is not worn, a great advantage in regrinding.

On a continuous cut, with the water jet, it was found entirely safe to use a side rake angle of 35 degrees to the horizontal, cutting 40 feet per minute, but on an intermittent cut the edge is likely to be nicked, causing overheating; so for average use an angle of 25 degrees is recommended. Using this sharp angle with the nose of the tool ground symmetrically brings the point very low. So it is recommended that the nose be ground at an angle of about 15 degrees to the shank, which has the effect of raising the point, and makes a much easier running tool.

Tools hardened in oil showed an endurance nearly 100 per cent greater than when hardened in the air blast. The best results are produced by heating a small portion of the end of the tool to a bright red and cooling in oil. This makes a hard edge but does not harden the body of the tool, leaving it tough, and making a tool adapted to heavy service. The only objection to oil hardening is that it sometimes cracks the tool, although seldom so seriously as to impair its strength.

Wrought Iron—For the proper speed of cutting wrought iron no definite figures can be given, as this depends almost entirely upon the amount of slag in the iron. On good clear iron speeds of over 80 feet per minute can be maintained easily, with a 1-10-inch feed and 3-16-inch cut, using a 25 degree to 30 degree tool and a water jet, but a piece of cinder is apt to ruin a tool at once, even when running as slow as 40 feet per minute. The indications are that a speed of 60 feet per minute will generally be found satisfactory, using a water jet, with tools ground and hardened the same as for steel.

Cast Iron—On cast iron, excellent results were obtained from tools hardened by being heated to a welding heat and cooled beside the fire. Such a tool will not hold a fine enough edge for finishing, but for roughing cuts on medium iron it will far outwear an oil-tempered tool. The side rake angle recommended for these tools is 15 degrees. They may be run safely at from 45 feet to 55 feet per minute, depending upon the density of the iron. If much scale is to be cut, 40 feet is the highest safe speed. Light finishing cuts with oil-hardened tools may be run as high as 85 feet per minute with a fair degree of accuracy.

Cutting-off tools should be oil hardened and will last longer if the sharp corners are removed. They will stand a speed of 40 feet per minute, but the cross feed allowable varies from .012 inch to .025 inch, depending upon the hardness of the iron. If the feed is kept at the upper limit and the cutting speed is

reduced, the tool will not last as long as with the high speed and finer feed. Electrical measurements of power showed that a roughing tool working upon cast iron would absorb, without breaking down, only about 50 percent as much power as a tool of the same hardness cutting clean wrought iron, both being ground to suit the material worked upon. Coupled with the fact that a piece of slag in a wrought-iron cut will ruin a tool with no increase in the power required, this indicates that the life of a cutting tool is dependent upon the character of the metal it is cutting as well as upon the power absorbed. A tool applied with considerable pressure to a slow-speed emery wheel will burn much sooner than if applied more lightly to the same wheel running faster. Working upon a material such as cast iron, whose action upon a tool is similar to that of an emery wheel, some benefit may result from the use of a high speed with a fine feed and consequent low pressure against the side of the tool. But in the case of wrought iron and steel, although no data on the subject are at hand, it is not probable that the increase of speed possible would compensate for the reduction in the feed.

Following is a tabulation of the principal results of the tests:

Material	Form of Tool	Angles			Speed. Feet per Min.	Feed. Inches per rev.
		Side Rake	End Rake	Clearance		
Axle Steel.....	Roughing.....	25 deg.	10 deg.	8 deg.	35 to 45	.10
Wrought Iron..	Roughing.....	25 "	10 "	8 "	35 to 80	.10
Cast Iron..	Roughing.....	15 "	10 "	8 "	45 to 55	.10
Cast Iron.....	Cutting-off...	0 "	0 "	8 "	40	.012 to .025

—[American Engineer and Railroad Journal.

OBITUARY.

Nathan Washburn, the inventor of the chilled steel Washburn car wheel, a very important invention connected with modern railroading, died at his home at Stafford Springs, Conn., Sept. 15, aged 85 years. In 1844 he established a foundry in Stafford and perfected the chilled steel process. In 1876 he began the manufacture of locomotives at his Worcester plant.

H. Chester Van Sant, Eastern manager of the National Tube Co., died at his home in Philadelphia, Sept. 16, after an illness of six days. He was born in Western Pennsylvania in 1850, and when 17 years old went to Philadelphia and secured a position with the Morris & Tasker Co., with which he was associated until its absorption by the National Tube Co.

William McKinley, of Brooklyn, N. Y., died on Sept. 14, the second anniversary of the death of the late president of the United States. He was 80 years of age, and was an ardent admirer of President McKinley, although not related to him. He had lived in retirement for a number of years, but was for a long time senior member of the firm of McKinley & Fruack, which carried on a foundry business in New York.

John R. Barker, a Chicago pioneer, died Sept. 14, aged 71 years. He was a member of the firm of Barker & Jackson, manufacturers of furnaces.

H. B. Irvin, master mechanic of the Pressed Steel Car Co., Pittsburg, Pa., passed away at his home in Allegheny last week.

John R. Grist, one of the pioneer residents of the Mahoning Valley, died at his home at Lowellville, O., on Tuesday, Sept. 15, at the age of 79 years. In 1853 the deceased became connected with the Crawfords in the iron manufacturing business at New Castle, Pa., and later became part owner of the Moselle furnace in Missouri, operated under the firm name of J. H. Brown & Co. In later years he held an interest in a number of the larger iron and steel enterprises in the Mahoning valley, although at the time of his death he took no active part in the management of any of the concerns in which he was interested.

The Creusot Co., one of the largest manufacturers of iron and steel in France, proposes to construct large blast furnaces in Chili. A syndicate is to be organized with a capital of $3,500,000 to erect the plants. It is expected that the Chilian Government will aid in the promotion of the enterprise.

TRADE PUBLICATIONS.

A number of letters from satisfied users of Freeman boilers forms the burden of a pamphlet from the S. Freeman & Sons Mfg. Co., of Racine, Wis. A few extra pages present some pithy arguments for the corrugated furnace boiler, and a number of comparative diagrams are submitted by way of showing the difference between some boilers and others in the matter of heating surface, amount of brick, etc. The argument is not neglected in the cold type, but the readiness of the sketches in catching the eye of the reader helps out the text materially and is skillfully handled.

A neat folder comes from Henry Pels & Co., of New York, in regard to beam punches. These punches have the frames made of steel plate and all parts of the mechanism are outside the frame. Illustrations are submitted of two types, rack as well as the eccentric lever, and the folder has a page forming an addressed postcard to encourage business acquaintance.

Another installment of the "Arrow" is at hand and treats of the tin made by the N. & G. Taylor Co., of Philadelphia.

The Avery Stamping Co., of Cleveland, has prepared a circular of the new line of plain back shovels for molders. The blade is made of high carbon steel and the handle is of fitting type. The distinguishing feature about the shovel is the plain back construction, the manner of construction being claimed to give greatly increased length of usefulness.

Bulletin No. 5, Series T, tells of the steam and electrically driven pumps of the D'Olier Engineering Co., of Philadelphia. The firm is well known in connection with the application of the steam turbine and this type of prime mover is shown in some of the illustrations, the turbine and pump being connected by a flexible coupling and the two units mounted on a common base.

A card, entitled the "Champion of Noiselessness," deals with the effectiveness of rawhide of the "New Process" description for gear material. A few paragraphs outline the place and purpose of the rawhide gears made by the New Process Raw Hide Co., of Syracuse, N. Y.

A small pamphlet treats of the motors made by the Northern Electrical Mfg. Co., of Madison, Wis. The smaller sizes of the Northern steel spherical motors are considered in the present publication and dust proof machines as well as the open type are illustrated. A number of views show the construction details. A complete price list, with weights, speeds and horsepowers of the various sizes is a commendable feature.

A special circular, No. 42, is in the main devoted to the plug drill recently described in *The Iron Trade Review*. A number of illustrations exhibit the field reached by the tool and there are several views of other devices made by the Chicago Pneumatic Tool Co., of Chicago.

Points on Belting.

Factor of safety for a laced belt is one-sixth its breaking weight for leather, and one-eighth for rubber.

A belt traveling 3,500 feet per minute will require a tension of but 9½ pounds for each inch in width in order to transmit 1 h. p., and one having a width of 100 ÷ 9.5 = 10.5 inches, will transmit 100 h. p.

To find the length of a roll of belting (approximately): Take the sum of the diameter of the roll and the "eye" in inches, multiply this by the number of turns or laps made by the belt, and this product multiplied by the decimal .1309 will equal the length of the belt in feet.

A strip of single belting, 1 inch wide and 13 feet long, weighs, approximately, one pound, and a similar strip of double belting, 8 feet long, also weighs a pound; so that the weight of a belt may be estimated by multiplying the width in inches by length in feet, and dividing the product by 13 for single and 8 for double belts; the quotient will be the weight in pounds.

To find the length of belt needed when you have the diameters of the pulleys, and the distance between the centers of the shafts, multiply half the sum of pulley diameters by 3.2 and add twice the distance between the centers of the shafts. This result is usually near enough for practical purposes. If, however, the diameters are very different and the centers short the result will be too small. If the pulleys are exactly the same diameter multiply by 3.416 instead of 3.2—[Power and Transmission.

A DECISION ON WROUGHT PIPE PATENTS.

Inventions that are in the natural course of improvements are not patentable according to a decision handed down by Judge Buffington in the United States Circuit Court at Pittsburg this week, in the suit of the National Tube Co. against Spang, Chalfant & Co. The decision of Judge Buffington is important, as he lays down general rules relative to patents on improvements, and dismisses the bill of equity, saying Patterson's patent, which was involved in the case, is simply a step in the natural course of improvements and not valid.

Judge Buffington describes the method of making pipe by the butt weld and the lap weld processes. The expense and difficulty of charging the furnace from the front are set forth and the efforts to secure a better plan noted. The court then says:

"A vast amount of testimony has been taken to show the value of the back charging practice and its advantage over former methods. We so regard it. It is a natural, continuous straightway method, and like all such improved methods of handling, it avoids congestion of workmen, allows steady, as compared with intermittent work, it utilizes the same heat and labor to produce a larger product. We are also satisfied that by a quiescent charging better heat results are obtained. We are satisfied further that the practice has developed advantages additional to the two which alone the patentee had in mind, and referred to in the application viz.: Even longitudinal heating and separation of the working force. But conceding such difference and progress the fact still remains that the step here made was one of gradual and to be expected progress which mark every great and, therefore, progressive industry."

The opinion declares that the principle of back charging was not Patterson's invention, nor was quiescent heating; that he simply utilized these principles. "It is not everything that is novel and exceedingly valuable that is patentable," the court says. Again he finds:

"Each forward step prepares the way for another and to burden a great industry with a monopoly for each improvement for any step thus made, except when marked by an advance greater than mere progressive skill, is hostile to progress.

"While the testimony of the experts in this case shows the thermal and operative advantages of back charging, a conclusion to which we agree, and while the process is simple, effective and economic, we are, nevertheless, satisfied it involved no invention. In our judgment it was but the steady evolution and development incident to an industry where competition pushes progress to constant change. In this advance the movable table and the successful tongs were material factors. Back charging was the natural step in advance when these factors were provided. So holding, we are of the opinion that the patent is invalid and the bill must be dismissed."

Implement Manufacturers' Convention.

The tenth annual convention of the National Association of Agricultural Implement and Vehicle Manufacturers, which will be held in Cleveland Oct. 21-23, promises to be one of the most interesting in the history of the association. The order of business is as follows: Opening prayer, Rev. W. B. Pickard; Address of Welcome, Hon. Tom L. Johnson, mayor; Response, W. S. Thomas, Springfield, O.; president's address, Martin Kingman; reports of officers and committees; address by Hon. John Charlton, M. P., and member of the Joint High Commission, of Lynedoch, Ontario, Canada, subject, "Reciprocity with Canada"; adoption of resolutions; miscellaneous business. A fine program of entertainment has been provided for both ladies and gentlemen. There will be a banquet on the evening of Oct. 22. Senators Foraker and Hanna have been invited to respond to toasts at the banquet. The Rev. Caspar Wistar Hiatt, of Cleveland, will respond to the toast, "Women of America."

Kidd Bros. & Berger, who operated a wire drawing plant at McKees Rocks, Pa., which was recently destroyed by fire, have decided to locate their new plant at Aliquippa, Pa., adjoining the plant of the Vulcan Crucible Co.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Palmer Oil Engine Co., Detroit, has been incorporated with a capital of $15,000.

The Charlotte Machine Co., Raleigh, N. C., has been incorporated with a capital of $25,000. The objects of the company are the engineering, designing and construction of general machine work. The incorporators are: E. W. Thomas, Columbia, S. C., Byron F. Cord, and S. B. Alexander, Jr., of Charlotte, N. C.

The Western Steel Co. has been incorporated at Des Moines, Ia., with a capital of $10,000, for the purpose of constructing and operating water, light and power plants, and for the construction of buildings, bridges and for structural iron and steel work.

The Wood Turning Machine Co., Beloit, Wis., has been incorporated with a capital of $25,000, for the purpose of buying and selling machinery.

The Plainfield Tool & Equipment Co., Plainfield, N. J., capital $100,000, has been incorporated to manufacture tools and machinery.

The Cloverport Foundry & Machine Co., Cloverport, Ky., has been incorporated with a capital of $3,000, to manufacture and repair machinery, manufacture castings, screen wire and wire novelties.

The Morgan Safe Co., Chicago, capital $2,500, has been incorporated to manufacture safes.

The McCallum Steel Wagon Co., Plymouth, Ind., has been incorporated with a capital of $225,000, and will manufacture steel wagons and agricultural implements.

The Chicago Iron & Machinery Co., Chicago, capital $20,000, has been incorporated to manufacture machinery. The incorporators are L. F. Corcoran, G. J. Crane, G. A. Bruck.

The Walter J. Wood Stove Co., Atlanta, Ga., recently incorporated, will be pleased to receive catalogues and discounts from manufacturers who cater to the stove and house trade. The new company will do a jobbing and retail business.

Fires and Accidents:—

Fire in the plant of the Hansom Machine Co., Boston, a few days ago, caused a loss estimated at $7,000.

Fire in the plant of the Murray Iron Works, Burlington, Ia., Sept. 14, caused a loss of $1,000.

The plant of the Welsh Machinery & Supply Co., Lake Charles, La., was visited by fire and almost completely destroyed Sept. 16. Loss $15,000.

The plant of the Crescent Mfg. Co., Muskegon, Mich., was struck by lightning Sept. 15 and destroyed by the resulting fire.

New Construction:—

The Norton Mfg. Co., Muskegon Heights, Mich., is building an addition, 32x172 feet, to be used as an erecting shop. The company has made extensive improvements in its boiler house and has installed a 30-h. p. gas engine built by the St. Marys Machine Co., St. Marys, O.

The Shaw-Walker Co., Muskegon, Mich., is erecting a building, 75x132 feet, which will be used as a card factory and general offices. This is the third addition in three years.

The Delaware River Steel Co., Chester, Pa., will shortly break ground on land adjoining the Vulcan Brass Works, for the erection of a large plant. Major E. H. Goodman, who for many years was connected with the Pullman Palace Car Co., as vice president, has been elected president of the new company. J. Parker Crittenden, of Philadelphia, is treasurer, and Edward J. Altemus, formerly connected with the Neafie & Levy Ship & Engine Building Co., is secretary. The corporation, organized under the laws of Delaware, is capitalized at $500,000.

It is now expected that the new plant of the Wilmington Malleable Iron Co., Wilmington, Del., will be completed by Nov. 1. The buildings will be occupied as soon thereafter as the equipment can be installed.

Work is progressing on the new foundry and power house,

now being erected by the Black-Clawson Co., Hamilton, Ohio. The foundations of the foundry are already in. It will be 55x280 feet.

The D. Clint Prescott Co., of Menominee, Mich., has perfected plans for enlarging the works in Menominee and adding from 50 to 100 men to the pay roll. A new machine shop is to be built as an addition to the present shop. It will be 70x175 feet. Two ten-ton electric cranes will be installed.

Work on the new tube mills of the United States Steel Corporation at Lorain, O., is progressing rapidly. The force of men on the new blast furnace is working overtime.

Roydhouse, Arey & Co., Philadelphia, have submitted an estimate to the Pennsylvania Railroad for the erection of a brick wheel foundry shop, 226x602 feet, at Burket Station, near Altoona, Pa.

The Georgia Car & Mfg. Co., Savannah, Ga., is preparing to increase the size of its plant.

The Gunther-Wright Machine Co., Owensboro, Ky., successor to Harry Gunther & Bro., has broken ground for its office, store room and shop. The store room and office will be 25x100 feet and the machine shop 40x140 feet, three story, brick mill structure. New machinery will be installed, but the company is not able to state exactly what will be needed. A considerable part of it will be light, and will be used for the manufacture of the Gunther governor.

The Southern Foundry Co., Owensboro, Ky., whose plant was recently visited by fire, is building a much larger and better equipped plant, and will soon have one of the best architectural iron manufacturing plants of the South. All the material except some rope drives has been bought.

The Pittsburg and Valley Districts:—

The bi-monthly wage settlements of the sheet and tin plate workers of the Amalgamated Association were made at Pittsburg, last week, resulting in no change in the wages for the months of September and October.

Ground has already been broken for the erection of the plant of the Butler Foundry & Machine Co., Butler, Pa. The plant will consist of three buildings, the steel foundry to be 150x300 feet, gray iron foundry 100x200 feet, and the power plant 60x200 feet. A boltless rail chain and a new car coupler will be the two principal specialties that will be produced. The company is capitalized at $500,000. Peter F. McCool is president and Charles Gettman is vice-president.

The Pittsburg Steel Co., Pittsburg, Pa., has purchased the coal mines and property of the Iron City Coal Co., located in Rostraver township, Westmoreland county. The steel company will thus be provided with an independent fuel supply amounting to from 400 to 500 tons daily.

The Fort Pitt Bridge Co., of Pittsburg, has been awarded the contract for the erection of the open-hearth and rolling mill buildings of the new plant of the Sweet's Steel Co., Williamsport, Pa.

At the meeting of the Pittsburg Coal Co.'s Employes' Association, held at Pittsburg, Pa., last week, it was announced that the employes of the company affiliated with the association are owners of four percent of the stock outstanding. Of the 320,000 shares issued the employes now own 12,499.

The Continental plant of the National Tube Co., Pittsburg, Pa., continues idle, although an effort to resume operations with non-union men was made last week.

At a meeting of the board of directors of the Pittsburg Stove & Range Co., held in Pittsburg, recently, it was decided to greatly increase the size of the Baldwin & Graham plant at New Castle, Pa. It is probable that the plant will be doubled in size.

The H. K. Porter Co., of Pittsburg, has purchased 2½ acres of land adjoining its plant in Allegheny for the purpose of making extensive additions to its plant. The property was purchased from the American Bridge Co. The output of the plant consists of narrow gauge mine and industrial locomotives.

General Industrial Notes:—

There has been a marked decrease in the car building industry of Detroit of late, and the number of employes has been greatly reduced within a few weeks. The railroads are not ordering cars to any extent, and when the orders do come they are sufficient to keep the works going only a few days. About 2,000 men employed in the two plants of the American Car & Foundry Co., a month ago, are idle or have found work in other plants.

The Vincent Valve Works, Sandusky, Ohio, which has been in the hands of a receiver for some time past, has been closed down. About 90 men are out of employment.

T. B. Ingwersen, Fulton, Ill., made a bid of $15,000 for the Mississippi Valley Stove Co.'s plant in that city last week, and the bid was rejected by the court and the trustee was ordered to sell the plant within the next thirty days to the best possible advantage.

The Buick Mfg. Co., Detroit, will move to Flint, Mich., as soon as the plant that is now being constructed can be completed. The company manufactures gas and gasoline engines. David D. Buick gives as a reason for removal inability to interest Detroit capitalists sufficiently to make an enlargement of the capital and plant necessary for the carrying on of the rapidly growing business of the concern.

O. P. Chatfield of Marinette, Wis., has completed arrangements for establishing a machine shop and brass foundry at Escanaba, Mich. Mr. Chatfield will continue to operate his plant at Marinette.

The Hart Emery Wheel Co., Toronto, Canada, has changed its name to the Hart Corundum Wheel Co. The business will be carried on on a more extensive scale.

Birch & Birch, general machinists and manufacturers, Crawfordsville, Ind., are a new firm, but have been very successful. Their shop equipment consists of entirely new machinery and tools, and the plant is well located in the manufacturing section of Crawfordsville. Their specialty is designing and building to order special machinery. They have built such machinery as woven wire fence machines, wire spooling machines, power presses and shears, match and match box making machinery, etc. They solicit correspondence with anyone having special machinery to build.

The Buffalo Steel Co., Tonawanda, N. Y., resumed work Sept. 14, after its annual shut down of about six weeks, during which necessary repairs were made, and a new continuous furnace, also automatic cooling beds, with additional machinery, which will give a much greater output, were installed. The company manufactures Bessemer bar steel, angles, channels, tees, special shapes for agricultural implements and light mine rails.

Some of the recent sales of the Edmonds Elevator Co., Cleveland, were the following: One direct connected electric passenger elevator for the Sherwin-Williams Co.'s new block on Canal St., Cleveland, also a direct connected electric freight elevator for the same building. Belt elevator for the Diamond Glass Co. Hydraulic elevator for L. A. Stone, Cleveland. Belt elevator for the Forrester Plaster Co. Belt elevator for the Cleveland Press, also six hydraulic plunger lifts. Two dumb waiters for the American Silk Fibre Co. and half a dozen hand elevators for different parties throughout the city of Cleveland.

The American Locomotive Co. has received new orders for locomotives as follows: Mobile & Ohio, 20; Atchison, 14; Nashville, Chattanooga & St. Louis, 10, and Mobile, Jackson & Kansas City, 10.

The new boiler works plant of the Zier Boiler & Sheet Iron Co., New Albany, Ind., is now in operation. The buildings are not completed, but work has been begun on account of the large number of orders on hand.

Considerable American machinery will be installed in the new shops at Lucknow, India, of the Oudh & Rohilkund State Railway. The locomotive shops are to be made considerably larger and new machinery will be put in.

One of the officers of the Marinette Iron Works, Marinette, Wis., states that part of the works will probably be moved to Chicago Heights, Ill., where the gas engines can be manufactured more economically. The other parts of the works will remain at Marinette.

The Post-Tomlinson Co., Detroit, Mich., which claims to have a patented process which "will revolutionize the steel manufacturing industry," has written to many cities asking for encouragement in the building of a steel plant. Toledo and Denver are among the cities invited to compete.

The plant of the National Steel Co., at Columbus, Ohio, has been closed down, and it is not known when operation will be resumed. About 1,000 men are idle.